’13.6

TOTO

CLEAN DRY

HDR120

After Service Manual

Faucets & Appliances Development Dept.

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1 Product description

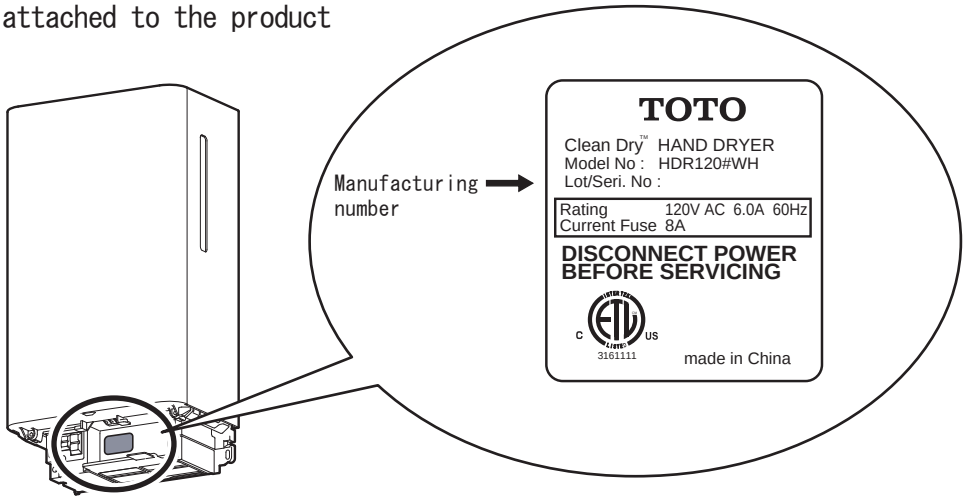
(1) Product description

Power Rating	Color of cover	Heater	Model number
AC120V 60Hz	White	-	HDR120#WH

2 Manufacturing number

(1) Location of the manufacturing number

Placed in the label attached to the product



(2) Explanation of the manufacturing number

Example 13 6 01 0123 4 A

- 13 — Year of manufacture (last 2 digits of the A.D.)
- 6 — Month of manufacture (1 - 9, X:10, Y:11, Z:12)
- 01 — Date of manufacture
- 0123 — Serial No.
- 4 — Factory of manufacture
- A — Factory management code

3 Specifications

Item	Description
Model name	CLEAN DRY
Model number	HDR120#WH
Power Rating	AC120V　60Hz
Power supply specifications	Directly connect to power supply
Power consumption	690W (6.0A)
Standby power consumption	2.3W or lower
Motor	AC Universal Motor and Turbo Fan
Heater	—
Safety device	Excess current fuse/Temperature fuse (Motor and power terminal block)
Dimensions (mm)	Width 300, depth 186, height 550
Mass	7.3kg
Water tray capacity	Approximately 950 ml (capacity before overflow)
Available set temperature range	Between 0 and 40 °C *Set a temperature that prevents condensation

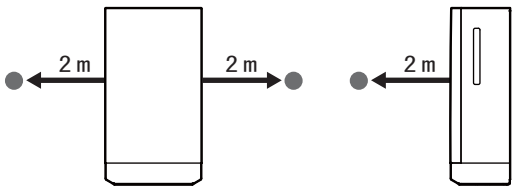
<Reference Data>

Air speed	※1	Approximately 93 m/s
Operating noise	※2	Approximately 57 dB

※１　Value measured just below the air outlet
※２　Value measured in an anechoic room (Average volume in 2 m around the product)

<Operating noise measuring condition>

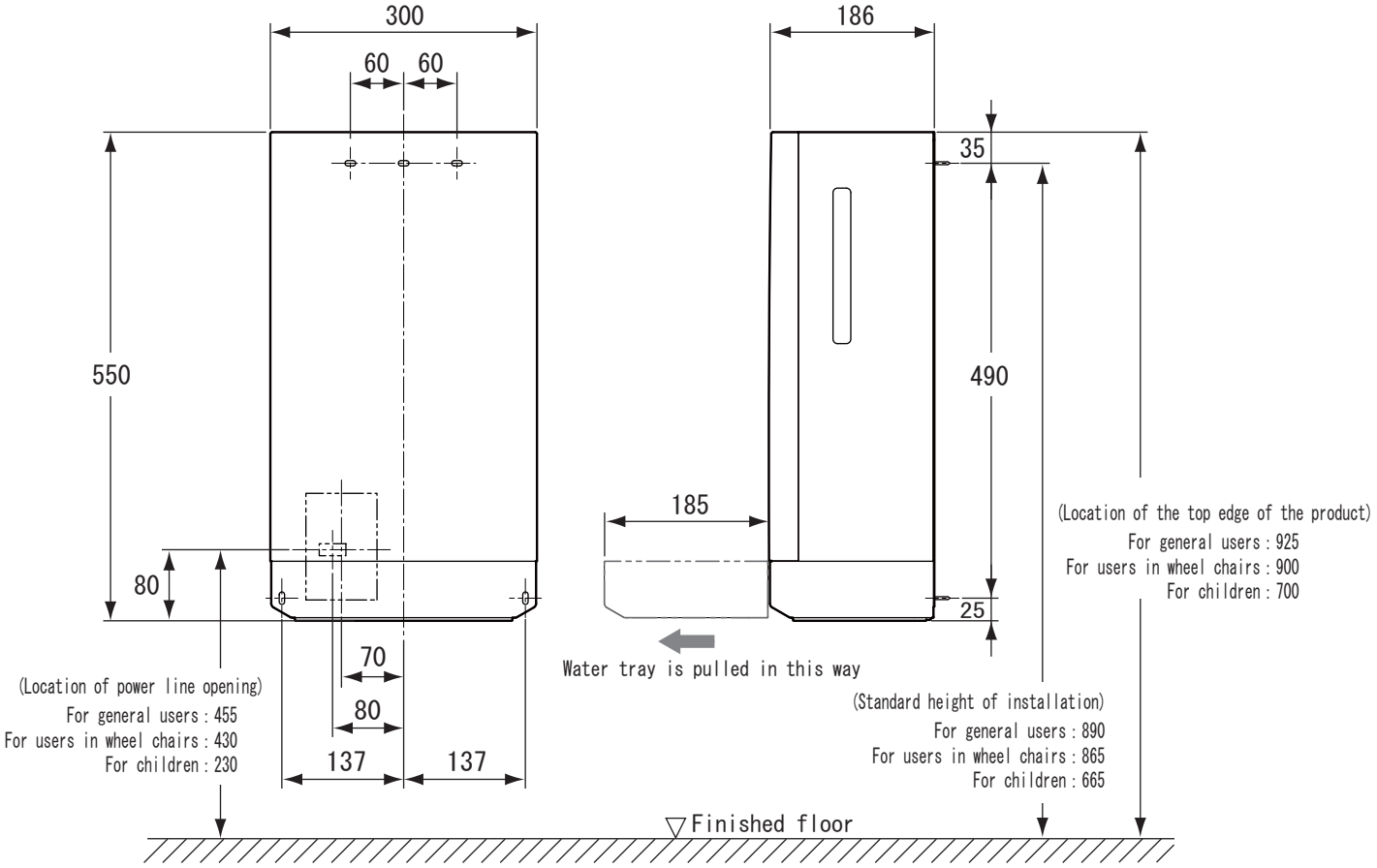
・We regard the average of the noise heard at 2 m distance from the front, left, and right sides of the product as the “operating noise.”



※　Because the noise was measured in an anechoic room, the value might be different when measured in the actual environment.

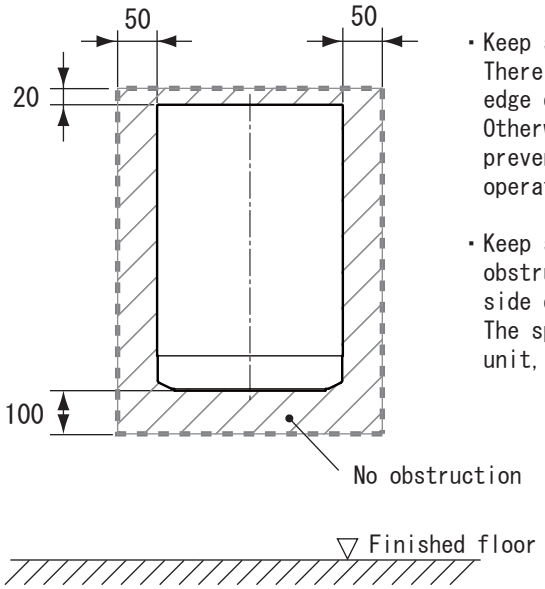
4 Dimensions/Construction information

(1) Dimensions/Standard space for installation



<Required space>

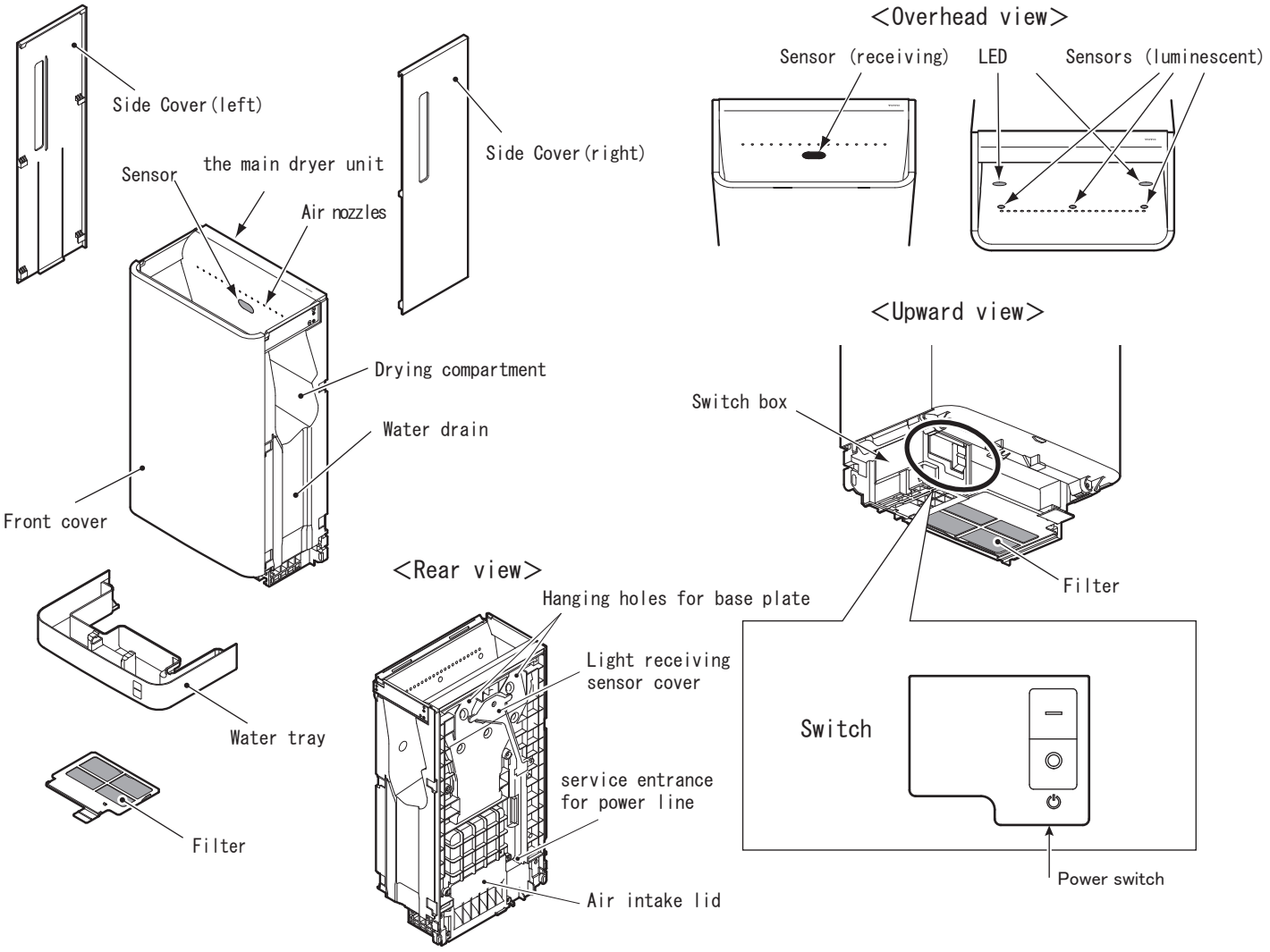
・Installation on the wall

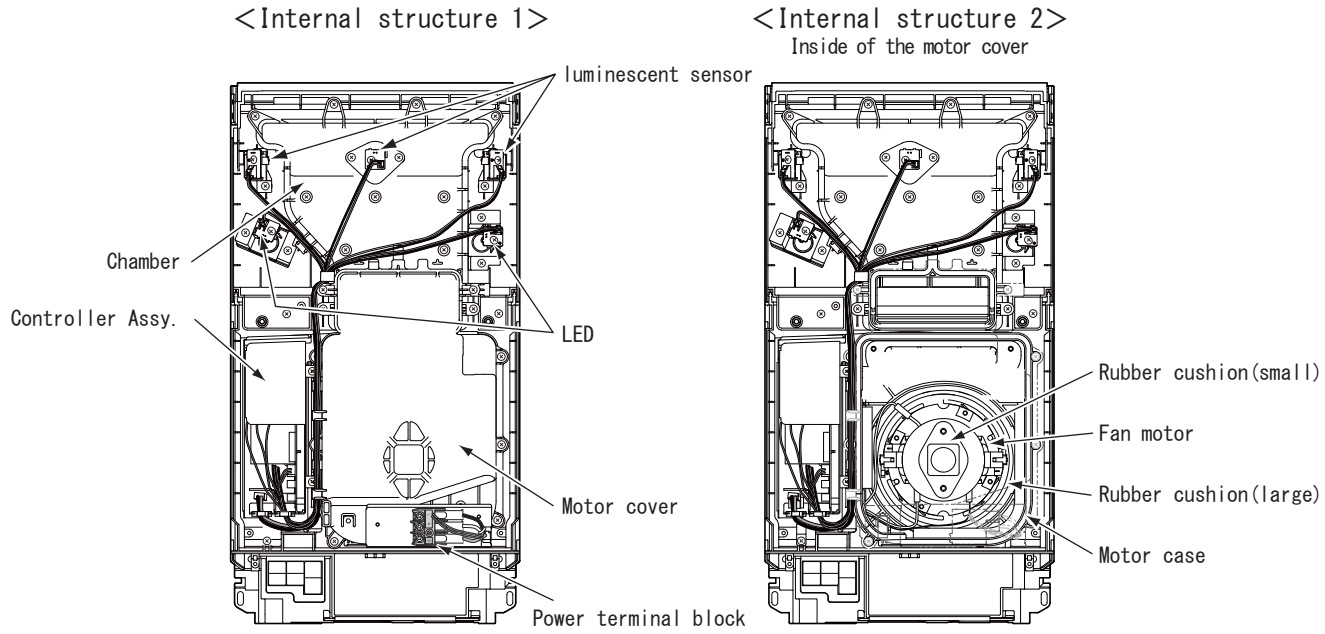


・Keep some empty space from the bottom edge of the product. There should be no obstructions within 100 mm from the bottom edge of the product.
Otherwise, it may lead to a malfunction, as the obstruction prevents the product from taking in enough air when in operating mode.

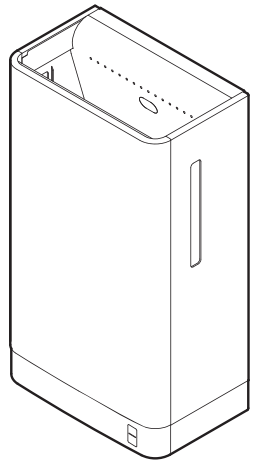
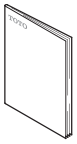
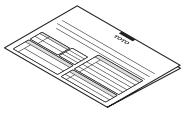
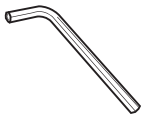
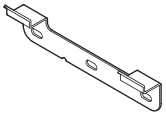
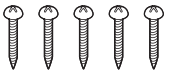
・Keep some empty space around the product. There should be no obstructions within 20 mm from the top, or 50 mm from either side of the product.
The space is required to install or uninstall the main dryer unit, and to remove the side covers for cleaning the water drain.

5 Names of parts

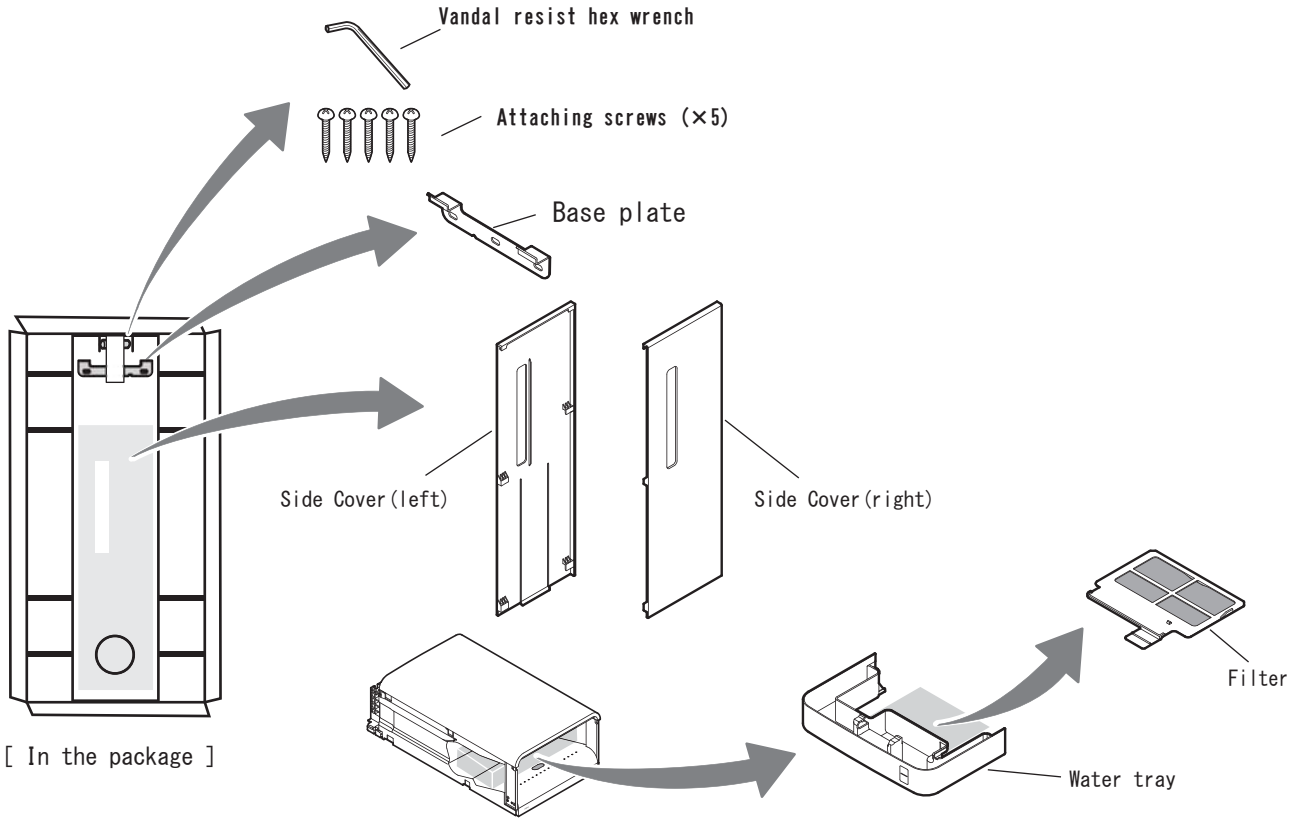




6 Included items

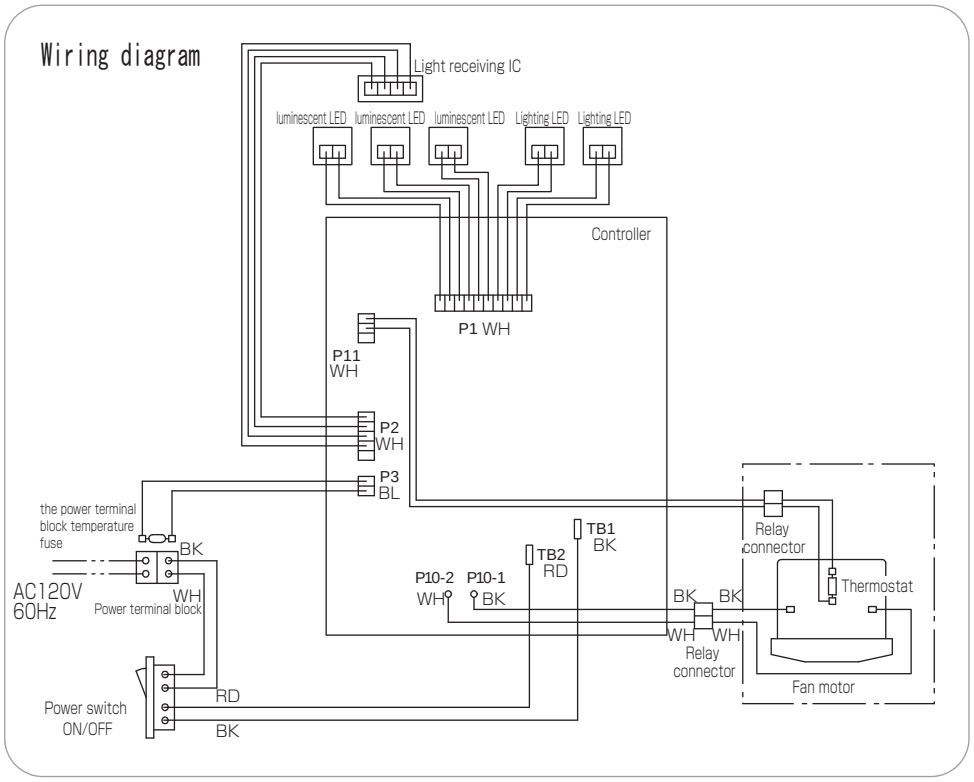
Product	Included parts		
	Instruction manual	Installation guide	Instruction label
			
	Vandal resist hex wrench	Base plate	Attaching screws
			 Tapping screws (×5, ϕ4.5×30)

<Packed location>



7 Wiring diagram

〈Wiring diagram〉



Thermostat・・・ P11
(Fan motor) (WH・3 pin)

Light receiving IC・・・ P2
(WH・5pin)

the power terminal block
temperature fuse・・・ P3
(BL・2pin)

Bipolar relay connector
(BK・WH line)
※Connected to the fan motor

P1・・・luminescent LED,Lighting LED
(WH・10pin)

Varistor

TB1 ・・・Power switch ON/OFF
(BK)

Excess current fuse(F2)
※Varistor

TB2 ・・・Power switch ON/OFF
(RD)

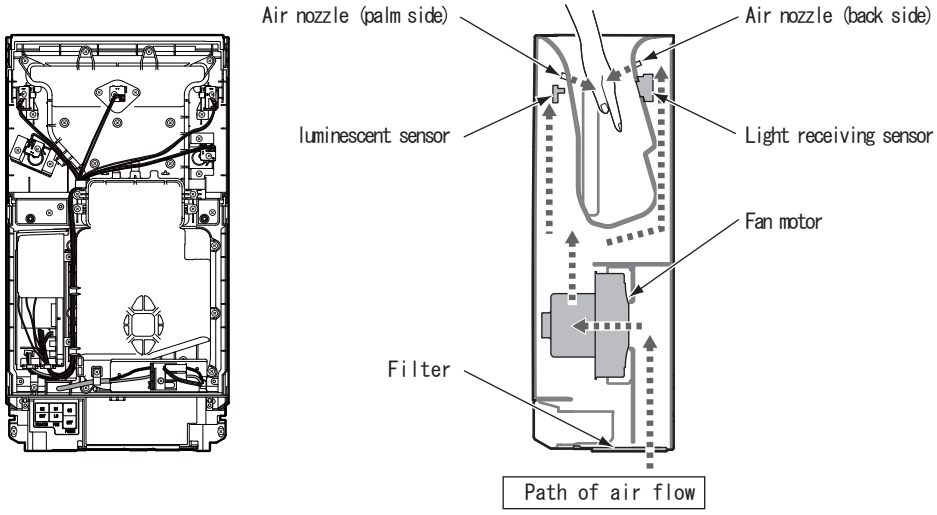
Excess current fuse(F4)
※Fan motor

8 Operating principle and mechanism

(1) Basic operation of this product

- When the product is turned on, the light receiving sensor detects light from luminescent sensors. (Standby)
- When hands are held between those sensors, the infrared ray does not reach the light receiving sensor, causing the microcomputer to detect the presence of hands and drive the fan motor to start drying.(ON delay: approximately 0.5 seconds)
- When hands are removed, the light receiving sensor is once again able to detect the infrared ray, causing the microcomputer to detect that the hands have been removed and stop the fan motor. (OFF delay: approximately 1.0 second)
- After 30 continuous seconds of no infrared ray detection, microcomputer stops the fan motor and stops checking for the presence of hands. After that, once the light receiving sensor receives an infrared ray, the unit will revert back to standby mode.

<Outline drawing (path of air flow)>



<Time chart>

Sensor input	
Motor output	

T1 : Motor ON delay ・・・Approximately.0.5sec.
T2 : OFF delay ・・・Approximately.1.0sec.

(2) Mechanism and features

① Fan motor(AC Universal Motor)

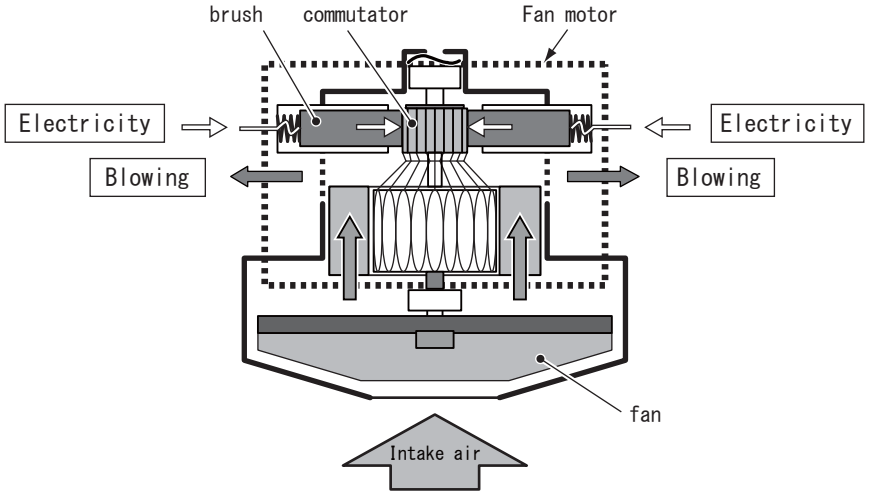
When you pass an electric current through a coil in a magnetic field, a motor will rotate using electromagnetic power acting on the coil.

A commutator motor is a motor that switches the direction of current based on its rotation using a rotating commutator and brush (principal integrant: carbon) on the commutator, to keep the rotation moment in given direction.

This product uses a commutator motor for the fan motor.

The brush will wear down little by little, as it is on a rotating commutator. Eventually, the brush will be totally worn away, losing contact with the commutator, and the motor will stop receiving power. (Open rest of fan motor)

Once the old fan motor has been replaced, the product can be used again.



② Safety device

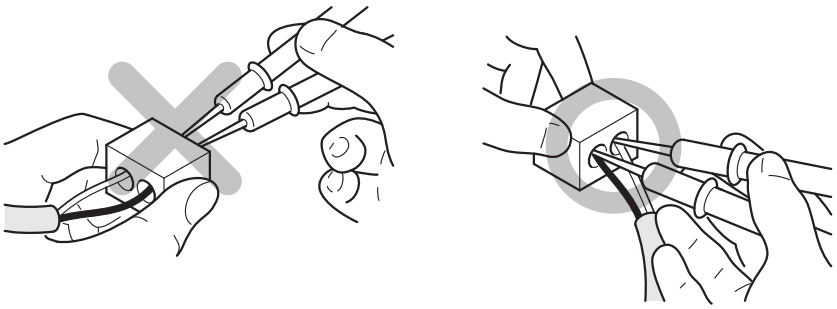
This product includes the following safeguards:

	Excess current fuse	Temperature fuse	Bimetal Thermostat
Fan motor	8.0 A	117℃	95℃
Power terminal block	—	102℃	—

9 Notes on repair

(1) Points of caution on when performing a check

1. Never touch the live part with bare hands while power is on.
   It is very dangerous and may cause electrical shock.
   When measuring electrical voltage, be very careful not to cause a short circuit by accidentally disturbing cords or jacks.
2. The controller of the product is equipped with female connectors, while the loads (motor, heater, etc.) use male connectors. To measure the electrical resistance at the load side of the connector, insert the circuit tester pin from the line side of the connector.
   (Inserting pins from the opposite side will stretch the contact, and may cause a bad connection.)



(2) Points of caution when using a circuit tester

1. Make sure to switch the breaker on the distribution board to “OFF” or unplug the main plug from the socket before measuring power resistance or checking diodes.
2. When measuring power resistance, set the resistance unit (Ω・kΩ) of the circuit tester range.
3. Because feedback input can prevent an accurate measurement, be sure to unplug the connector before starting the measurement.
4. When performing a diode check, first set the circuit tester range to diode check (→|–).
5. Never measure the voltage with the tester set to resistance range or diode range. Doing so will cause damage to the tester.

(3) Tools and measuring instruments

The following tools and measuring instruments are useful for repairs and checks.

Tools

- nippers
- longnose pincers, pincers
- drivers (+ (2 types of #1 and #2), and -)
  Magnetic-backed one is preferable
- electrical screwdriver
  (for installation of the product)
- pliers

Measuring instruments

- circuit tester
  Diode check function (→|–)
  might be required.
- digital thermometer
- clamp meter(prove type ammeter)

Others

- dust rug
- a vacuum sweeper (for cleaning filters)
- extension cords

10 Troubleshooting

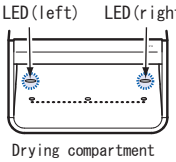
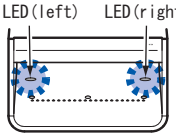
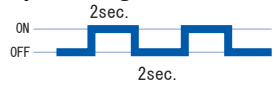
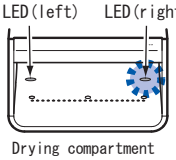
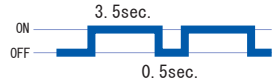
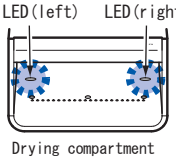
1. First, obtain sufficient information about the problem from users.
   (A) problem status (which function?)・・・・・single or multiple functions
   (B) situation (in what way?)・・・・・・・・・・what specifically
   (C) progress (from when?) ・・・・・・・・・・always or occasionally
   (D) indicator・・・・・・・・・・・・・・・・・・・the status of LED indicator in the drying compartment
   (check the status, referring to the table below.)
2. Next, put the unit in action to check the problem.
   (A) Depending on the nature of the problem, provide the customer with an explanation about the product.
   (B) If the problem does not appear again, ask customer to wait and see.
   (C) Verify the following situation:
   Is there no power outage or thunderbolt?

<Indicator Status> This context in the table below can be found in the instruction manual as well.

The flashing pattern of LED is ordered according to its priority, when several notifications (errors and fan motor replacement notification) are raised at the same time.

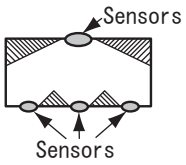
1. Flashing pattern 1 > 2. Flashing pattern 2 > 3. Flashing pattern 3

Ex.: When errors for flashing patterns 1 and 2 are raised at the same time,
➡flashing pattern 2 will appear after fixing the cause of flashing pattern 1.

		Status indicator lights	Meaning of the indicators	Operation of the product/Solutions
1		No light	No power is supplied (*1)	The dryer is not working.
2	Standby	Lights on 	Power is being supplied (Standby)	An indicator is lit dimly all the time.
	The dryer is activated	Lights on 	Power is being supplied (The dryer is activated)	An indicator is lit brighter than on standby.
3	Flashing pattern ①	Only the right indicator flashes  	Fan motor is malfunctioning	The dryer is not working. Clean filter if there is an accumulation of dust or debris. Clean the bottom of unit if there is an accumulation of dust or debris. If the error indicator is persistent, it means there is a malfunction. Deal with the problem.
			Abnormality with the power terminal block temperature fuse Controller is malfunctioning	The dryer is not working. Replacing it may solve the problem. Deal with the replacement.
4	Flashing pattern ②	Right and left indicators flash alternately  	Sensors keep malfunctioning	The dryer may operate even if some sensors malfunction. Verify that sensors are clean. If they are not clean, wipe them with a soft damp cloth. If the unit is exposed to direct rays, keep the unit away from the rays with blocking out rays. If the error indicator is persistent, it means there is a malfunction. Deal with the problem.

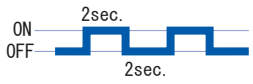
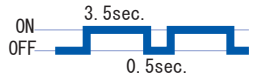
3. Problem besides malfunction

The status conditions below are not due to a malfunction. Ask customers to perform remedies.

Symptoms	LED Indicators	Items to be checked	Solutions
No dry air blown when hands put in	No light	<Power Switch> Power Switch might be set to OFF " ◎ " .	If so, set Power Switch to ON "⎓" .
		<Circuit Breaker> Has the Circuit Breaker ON been tripped?	If it is OFF, please reset it.
	Lights on	<Status of use> Due to the location of Sensors, detection of hands is difficult in some places, including between Sensors and near the corners (hatched areas in the illustration).  	Align the fingers and put both hands fully into the drying compartment in places other than the hatched areas in the illustration. If the air blows, the dryer is working properly.
	Right and left indicators flash alternately <Flashing pattern ②>	<Sensors> Continuous detecting error is raised. ●Has something been placed inside the unit that could be blocking a sensor?	If there is something in the unit, remove it.
		<Sensors> Continuous detecting error is raised. ●Is the sensor dirty?	If the sensor is not clean, wipe it with a soft damp cloth.
		<Sensors> Continuous detecting error is raised. ●Is the unit exposed to direct rays?	If the unit is exposed to direct rays, keep the unit away from the rays with blocking out rays.
	only the right indicator flashes <Flashing pattern ①>	<Filter> Has Filter accumulated dust or debris?	Clean Filter if there is an accumulation of dust or debris. If the unit works properly when turned on after the remedy, it is not a malfunction.
		<the ambient temperature> Is the ambient temperature within operating temperature limits?	If the unit works properly when turned on after the remedy, it is not a malfunction. (Set the temperature within 0 to 40 ° C (32 to 104 ° F).)
Dryer not stopped when hands removed.		<opration of the product> Stopping 1-2 seconds later is normal.	—
		<Sensors> Is the sensor dirty?	If the sensor is not clean, wipe it with a soft damp cloth.
		<Sensors> Is the unit exposed to direct rays?	If the unit is exposed to direct rays, keep the unit away from the rays with blocking out rays.
Warm air is blown		<Filter> Has Filter accumulated dust or debris?	Clean Filter if there is an accumulation of dust or debris.
		<the ambient temperature> Is the ambient temperature high?	The air might fell colder when the temperature is high.
		<Status of use> Is the dryer active for a long time?	The air might become warmer when active for a long time due to heat from the fan motor.
The air volume is weak		<Filter> Has Filter accumulated dust or debris?	Clean Filter if there is an accumulation of dust or debris.

11 Flow chart of troubleshooting

■Table of troubleshooting flows

No.	Symptoms	Case of not a malfunction Refer to “12. Troubleshooting” on page 15	Case of malfunction Follow the flow chart below	Reference pages
1-1	No air blows LED Indicators : No light	・The power is OFF “ ◎ ”, the circuit breaker is OFF	・A failure in the power circuit ・Combination of malfunctions, no light and no air	P14
1-2	No air blows LED Indicators : Flashing pattern ① only the right indicator flashes 	・The ambient temperature is higher or lower than the operating range ・Filter is clogged	・Open detection of fan motor ・High temperature detected inside the fan motor part ・The power terminal block temperature fuse blows ・Internal air trunk is clogged ・Controller is malfunctioning	P18
1-3	No air blows LED Indicators : Flashing pattern ② Right and left indicators flash at the same time 	・Continuous detecting error is raised.	・Malfunctions related to sensors ・Controller is malfunctioning	P21
1-4	No air blows LED Indicators : Lights on	—	・Controller is malfunctioning	P21
2	Dry air blows automatically	・Obstruction is in the drying compartment ・Sensor window is soiled ・Direct dayligh	・Malfunctions related to sensors ・Controller is malfunctioning	P22
3	The air volume is weak	・An obstruction exists within 100 mm from the bottom edge of the product ・Filter is clogged	・Internal air trunk is clogged ・Fan motor is malfunctioning ・Mating screw loose ・Controller is malfunctioning	P26
4	Warm air is blown	・Filter is clogged ・The ambient temperature is too high	・Internal air trunk is clogged ・Fan motor is malfunctioning ・Controller is malfunctioning	P28
5	No lighting (Dry air does blow)	—	・Malfunction related to lighting ・Controller is malfunctioning	P30
6	The circuit breaker is thrown	—	・Malfunctions related to power connections ・Internal short-circuit ・Controller is malfunctioning	P33

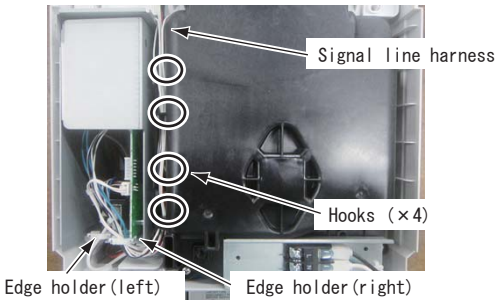
■Common operation (How to remove parts before an inspection)

Request

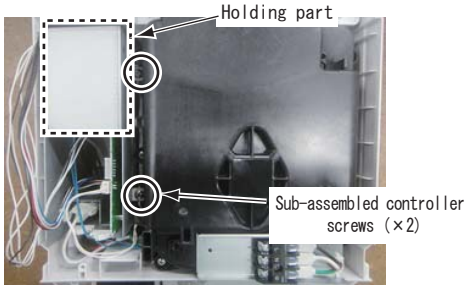
Switch both the breaker and the power switch to OFF“◎” before removing parts.

①To check inside the controller

Remove harnesses from edge holders (×2) and hooks (×4).

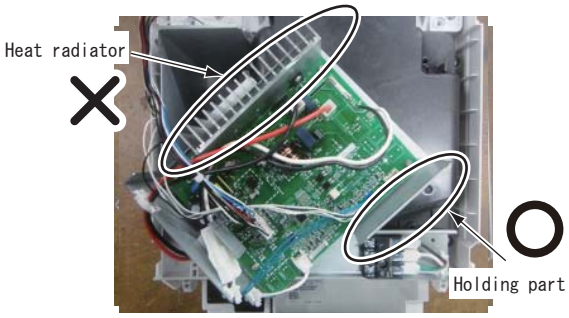


Remove sub-assembled controller screws (×2).



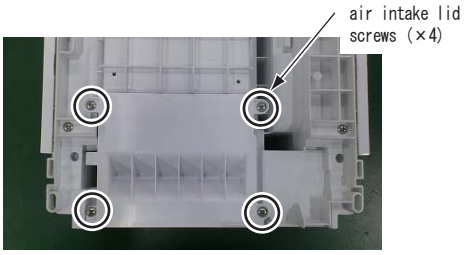
Hold the holding part on sub-assembled controller to remove it slowly. Then incline the controller to put on the motor cover.

*Never hold the heat radiator.
*When removing connectors, hold the holding part to remove the connector.



② To check the path of air of intake

Remove the air intake lid screws (×4) to remove the air intake lid.



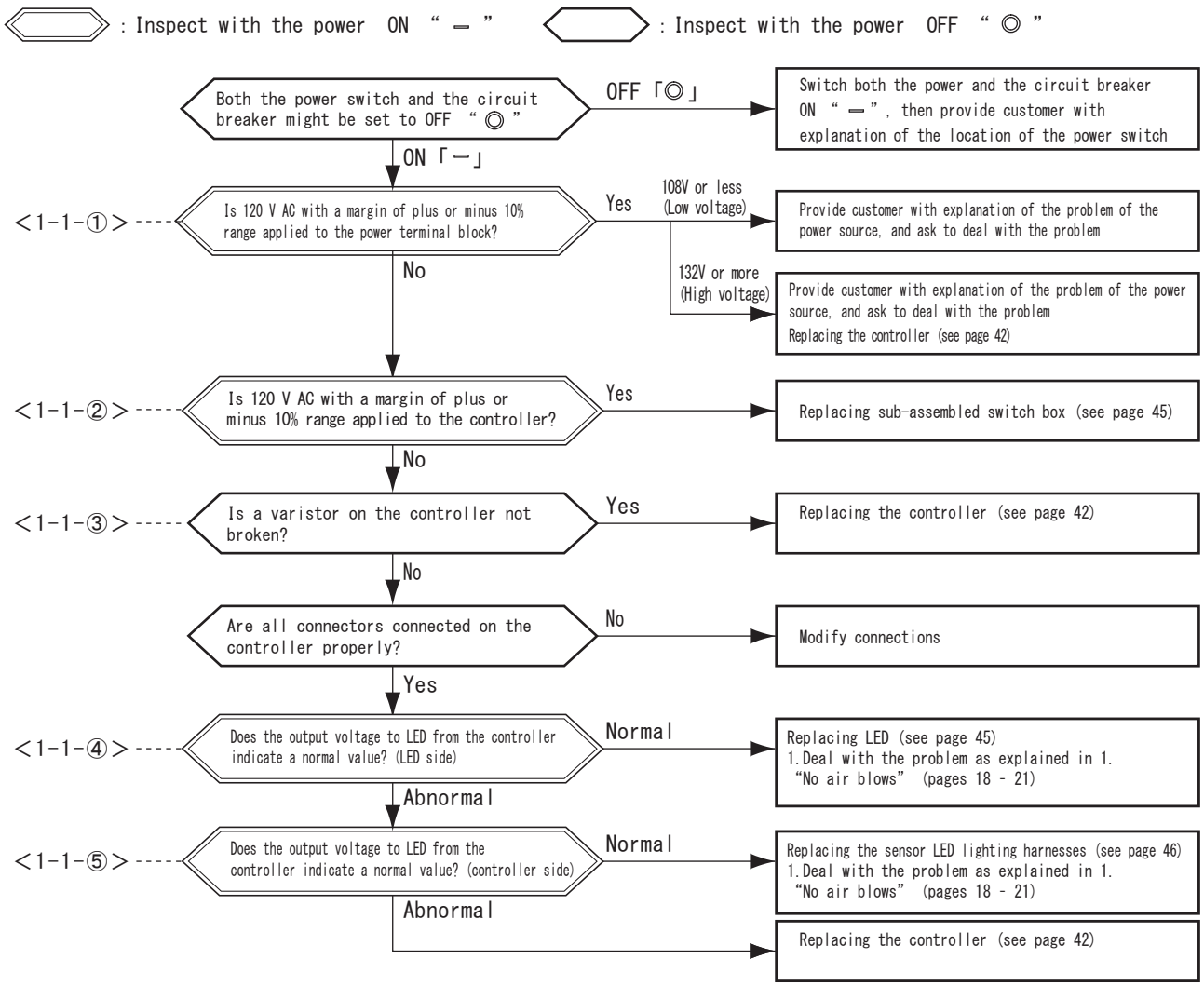
【Rear of the product】

1. No air blows (the fan motor doesn't work)

1-1. Case of No lighting

<Expected malfunction>

1) AC power (120 V AC) is not applied to the controller properly.
2) Combination of malfunctions related to LED lighting and others listed below prevent checking the error indication.
   - Motor thermostat part
   - Fan motor part
   - Power terminal block temperature fuse part
   - Light receiving or luminescent sensor part
   - Controller part


: Inspect with the power ON " ー "
: Inspect with the power OFF " ◎ "
Both the power switch and the circuit breaker might be set to OFF " ◎ "
OFF 「◎」
Switch both the power and the circuit breaker ON " ー ", then provide customer with explanation of the location of the power switch
ON 「ー」
<1-1-①>
Is 120 V AC with a margin of plus or minus 10% range applied to the power terminal block?
Yes
108V or less (Low voltage)
Provide customer with explanation of the problem of the power source, and ask to deal with the problem
No
132V or more (High voltage)
Provide customer with explanation of the problem of the power source, and ask to deal with the problem
Replacing the controller (see page 42)
<1-1-②>
Is 120 V AC with a margin of plus or minus 10% range applied to the controller?
Yes
Replacing sub-assembled switch box (see page 45)
No
<1-1-③>
Is a varistor on the controller not broken?
Yes
Replacing the controller (see page 42)
No
Are all connectors connected on the controller properly?
No
Modify connections
Yes
<1-1-④>
Does the output voltage to LED from the controller indicate a normal value? (LED side)
Normal
Replacing LED (see page 45)
1.Deal with the problem as explained in 1. "No air blows" (pages 18 - 21)
Abnormal
<1-1-⑤>
Does the output voltage to LED from the controller indicate a normal value? (controller side)
Normal
Replacing the sensor LED lighting harnesses (see page 46)
1.Deal with the problem as explained in 1. "No air blows" (pages 18 - 21)
Abnormal
Replacing the controller (see page 42)

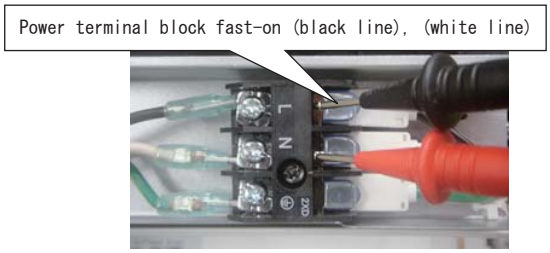
1-1. How to inspect

①Check the voltage applied to the product

Switch both the circuit breaker and the power to ON “ ⎓ ”.
Then measure the voltage at the fast-on on the power terminal block.

Measuring range : ACV

	Normal value	Abnormal value
Power terminal block fast-on (black line), (white line)	AC120V±10%	Other than the left



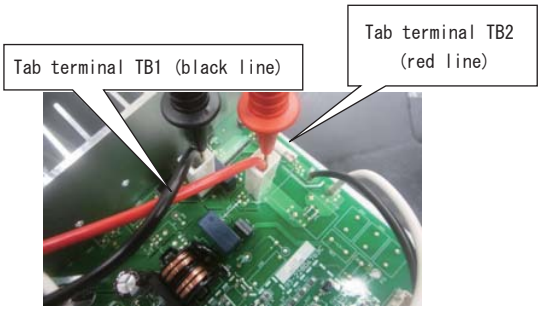
②Check applied voltage to the controller

Remove the sub-assembled controller.
(See “Common operation 1” (page 13))

Switch both the circuit breaker and the power to ON “ ⎓ ”.
Then measure the voltage at the tab terminals TB1 (black) and TB2 (red) on the controller.

Measuring range : ACV

	Normal value	Abnormal value
Tab terminal TB1 (black line), TB2 (red line)	AC120V±10%	Other than the left

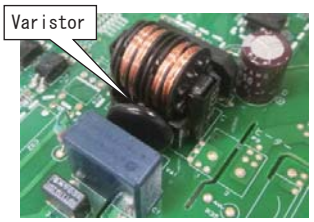


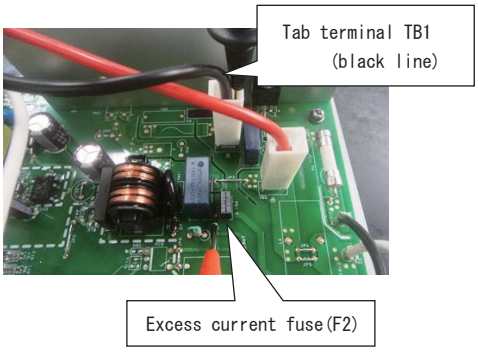
③Check a varistor on the controller

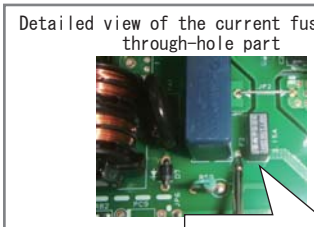
Remove the sub-assembled controller.
(See “Common operation 1” (page 13))

Switch both the circuit breaker and the power to OFF “ ◎ ”.
Then visually check a varistor on the controller.

	Normal value	Abnormal value
Varistor	Not broken	Broken







(See “Common operation 1” (page 13))

Switch both the circuit breaker and the power to OFF “ ◎ ”.
Then measure the resistance value at the tab terminal TB1 (black) on the controller and the through-hole of the current fuse (F2).

Measuring range : Ω

	Normal value	Abnormal value
Detailed view of the current fuse (F2) through-hole part	Approximately 0Ω	∞Ω

④Check the output voltage to LED lighting

【LED side】

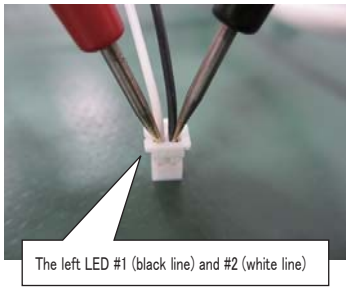
Remove the left and right connectors from LED.
Switch both the circuit breaker and the power to ON “ ⎓ ”.
Then measure the voltage at each left and right connector, for #1 and #2.

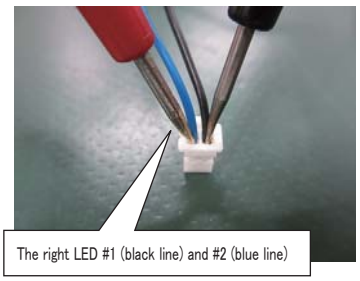
<When hands lay above the sensor> Measuring range : DCV

	Normal value	Abnormal value
LED left connector: #1 (black line) : #2 (white line)	Approximately DC2.9V	Other than the left
LED right connector: #1 (black line) : #2 (blue line)		

<When keeping hands out from the sensor> Measuring range : DCV

	Normal value	Abnormal value
LED left connector: #1 (black line) : #2 (white line)	Approximately DC1.2V	Other than the left
LED right connector: #1 (black line) : #2 (blue line)		





<To confirm LED malfunctioning>
◆ Diodes check on LED
Remove the sub-assembled controller.
(See “Common operation 1” (page 13))

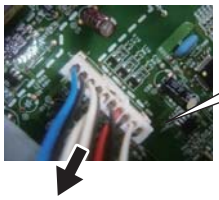
Switch both the circuit breaker and the power to OFF “ ◎ ”, and unplug the connector (P1) from the controller.
Then measure the diode on each of left and right connector, for #1 and #2.

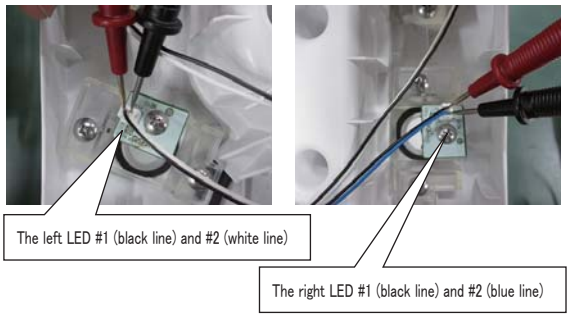
Measuring range : →|←

	Normal value	Abnormal value
LED left connector: #1 (black line) : #2 (white line)	Approximately DC1.0V	0 V DC (short-circuit malfunction) Indication including O.F or O.L. (malfunction)
LED right connector: #1 (black line) : #2 (blue line)		

*Use a circuit tester with diode check function.
(with →|← mark)

*Measure diodes with contacting + pin of tester on #1 (black line) and - pin on #2 (white/blue line).
If the tester indicated as “O.F.” or “O.L.” (means over the range), the polarity of tester pins is swapped or wire is broken.
Reverse the pins and measure again.





1-1. How to inspect

⑤Check the output voltage to LED lighting

【Controller side : connector P1】
Remove the sub-assembled controller.
(See “Common operation 1” (page 13))

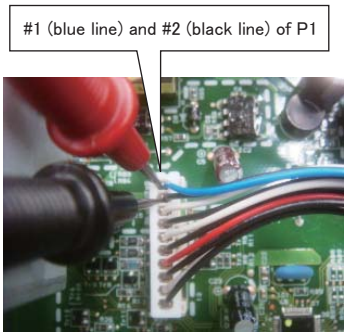
Switch both the circuit breaker and the power to ON “⎓”.
Then measure the voltage at the connector (P1) on the controller, each pair of #1 (blue line) and #2 (black line), #3 (white line) and #4 (black line).

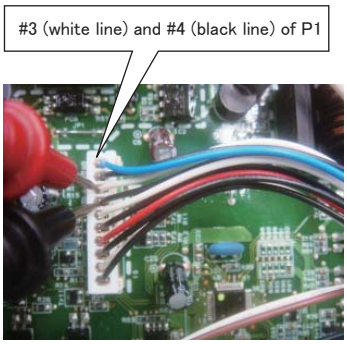
<When hands lay above the sensor> Measuring range : DCV

	Normal value	Abnormal value
Connector (P1): #1 (blue line) : #2 (black line)	Approximately DC2.9V	Other than the left
Connector P1: #3 (white line) : #4 (black line)		

<When keeping hands out from the sensor> Measuring range : DCV

	Normal value	Abnormal value
Connector (P1): #1 (blue line) : #2 (black line)	Approximately DC1.2V	Other than the left
Connector P1: #3 (white line) : #4 (black line)		





1. No air blows (the fan motor doesn't work)

1-2. When LED is flashing (in flashing pattern 1)

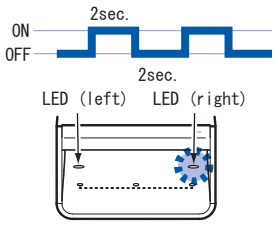
<Expected malfunction>

One of the following might be malfunctioning.

- Motor thermostat part
- Fan motor part
- Power terminal block temperature fuse part
- Controller part

Flashing pattern ①

: Only the right indicator flahes



: Inspect with the power ON " ⎓ "

: Inspect with the power OFF " ◎ "

◆ Multiple parts might be malfunctioning. Verify all items in

Are all connectors connected on the controller properly?
- No → Modify connections
- Yes ↓

<1-2-①> Is the resistance value of fan motor in normal range?
- Abnormal → Replacing the sub-assembled fan motor (see pages 38 - 41)
- Normal ↓

<1-2-②> Is there any continuity without thermostat in the fan motor?
- No → Replacing the sub-assembled fan motor (see pages 38 - 41)
- Yes ↓

<1-2-③> Is there any continuity for the power terminal block temperature fuse
- No → Replacing the power terminal block (see page 46)
- Yes ↓

<1-2-④> Does the output voltage from the controller to the fan motor indicate a normal value?
- Abnormal → Replacing the controller (see page 42)
- Normal ↓

Is the filter clogged?
- Yes → Clean the filter (see instruction manual). Then provide customer with explanation
- No ↓

<1-2-⑤> Check if the air intake lid or trunk is clogged.
- Yes → Remove the obstruction
- No ↓

<1-2-⑥> Does the fan motor contain any obstruction, distortion, or scratching? Check if there is no obstruction in the air trunk
- Yes → Replacing the sub-assembled fan motor (see pages 38 - 41)
- No →
  - The ambient temperature might have been outside of the available set temperature range.
  - Provide customer with explanation to turn the power on and check if the unit operates, if the same symptom is observed again.

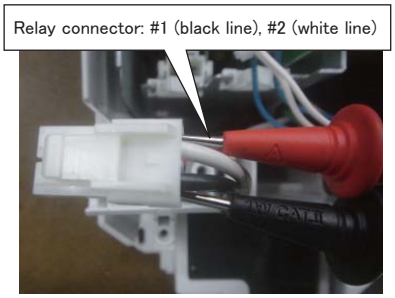
1-2. How to inspect

①Check the resistance value of the fan motor

Switch both the circuit breaker and the power to OFF “ ◎ ” and unplug the relay connector.
Then measure the resistance value.

Measuring range : Ω

	Normal value	Abnormal value
Relay connector: #1 (black line), : #2 (white line)	3 ～ 6Ω	Other than the left



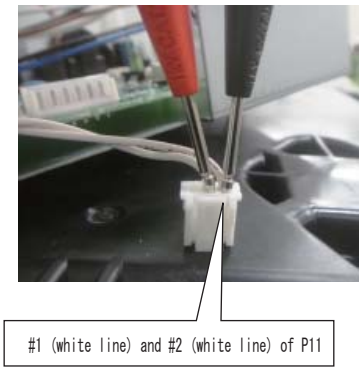
②Check the continuity of motor thermostat

Switch both the circuit breaker and the power to OFF “ ◎ ” and unplug the connector (P11) on the controller.
Then measure the resistance value.

Measuring range : Ω

	Normal value	Abnormal value
Connector (P1) : #1 (white line) : #2 (white line)	Approximately 0Ω	Other than the left

* Points of caution while measuring resistance value
Measure the resistance value only when the motor is at the normal temperature. Accurate value cannot be measured when the motor is in high temperature, including just after the operation. It’ s because of the motor’ s characteristic feature.



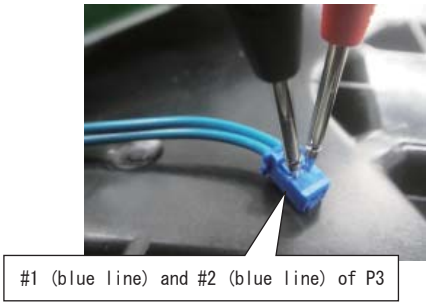
③Check the continuity of the power terminal block temperature fuse

【Controller side : connector P3】
Remove the sub-assembled controller.
(See “Common operation 1” (page 13))

Switch both the circuit breaker and the power to OFF “ ◎ ” and unplug the connector (P3) on the controller.
Then measure the resistance value.

Measuring range : Ω

	Normal value	Abnormal value
Connector (P3) : #1 (blue line) : #2 (blue line)	Approximately 0Ω	∞Ω



1-2. How to inspect

④ Check the output voltage to the fan motor

【Controller side: relay connector】
Switch both the circuit breaker and the power to ON “ ⎓ ”.
Then measure the voltage at the relay connector with hands laid above the sensor.

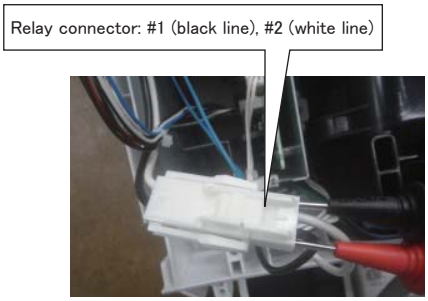
Measuring range : ACV

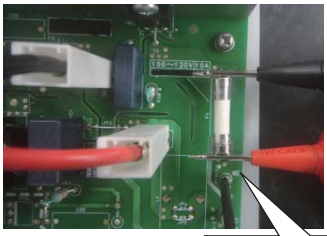
	Normal value	Abnormal value
Relay connector: #1 (black line), : #2 (white line)	AC120V±10%	Other than the left

<Case of abnormal value>
◆Check the current fuse Remove the sub-assembled controller. (See “Common operation 1” (page 13))
Switch both the circuit breaker and the power to OFF “ ◎ ”.
Then measure the resistance value of the current fuse (F4) on the controller.

Measuring range : Ω

	Normal value	Abnormal value
Excess current fuse(F4)	Approximately 0Ω	∞Ω

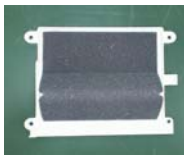


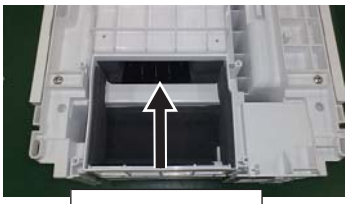


⑤ Check the stacking in the way of intake air

Remove the air intake lid.
(See “Common operation 2” (page 13))
Check if the air intake lid or trunk is clogged.

	Normal value	Abnormal value
Air intake lid the way of intake air	No obstruction	Obstruction exists





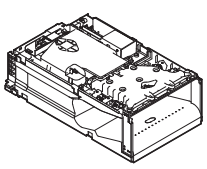
⑥ Remove the fan motor to check if there’s no malfunction

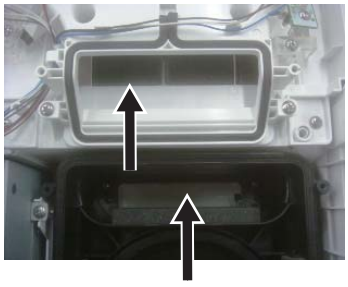
Remove the motor cover and the fan motor.
(Replacing the sub-assembled fan motor (see pages 38 - 41))
- Check if the fan motor contains any distortion or obstruction through holes (×5) on the fan motor.
- Rotate the nut on the fan motor with fingers to check if there is any scratching on the fan.
- Check if there is no obstruction in air trunks (×2).

	Normal value	Abnormal value
Inside of the fan motor	No obstruction, distortion or scratching	Obstruction, distortion, or scratching exists
Air trunk	No obstruction	Obstruction exists

Make sure to uninstall the unit and put it with the rear side down. Then start operation.

*Otherwise, fan motor may fall and result in injury or damage.





1. No air blows (the fan motor doesn't work)

1-3. LED is flashing (in flashing pattern 2)

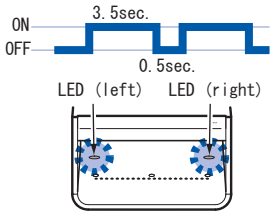
<Expected malfunction>

One of the following might be malfunctioning.

- Light receiving or luminescent sensor part
- Controller part

→ Refer to "2. The unit starts operating automatically when the power switch is turned on" (page 22)

Flashing pattern ②
:Right and left indicators flash alternately



1-4. LED lights on

<Expected malfunction>

The following may be malfunctioning.

- Controller part

→ Check if the unit operates again.
If the unit doesn't work yet,

Replacing the controller (see page 42)

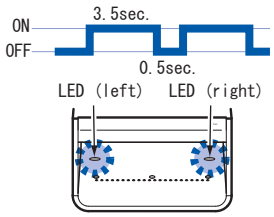
2. The unit starts operating automatically when the power switch is turned on (it stops approx. 30 seconds later, and LED starts flashing in pattern 2.)

<Expected malfunction>

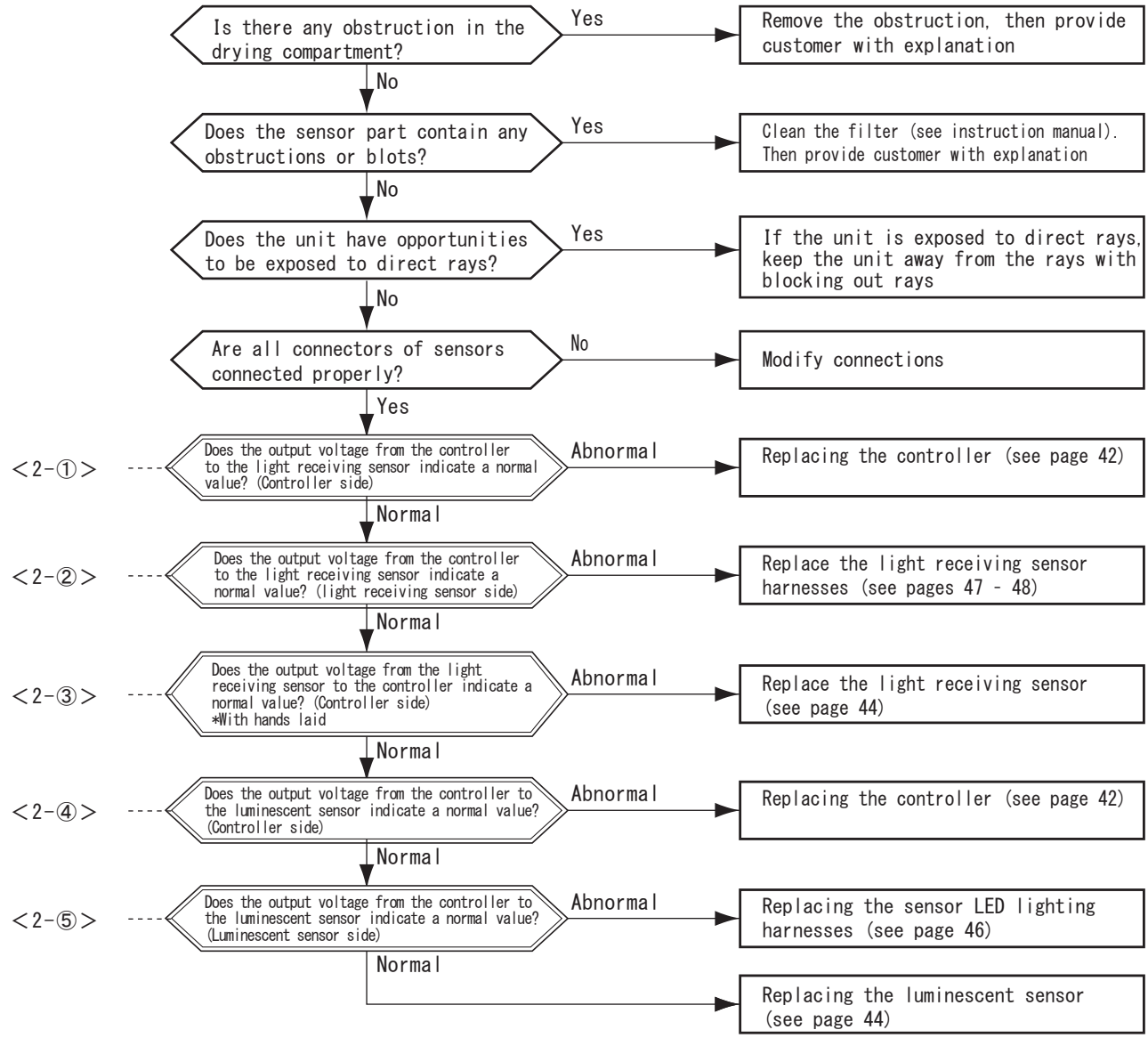
One of the following might be malfunctioning.

- Light receiving or luminescent sensor part
- Controller part

Flashing pattern ②
:Right and left indicators flash alternately



⬭ : Inspect with the power ON " ═ "　　⬭ : Inspect with the power OFF " ◎ "


Is there any obstruction in the drying compartment?
Yes
Remove the obstruction, then provide customer with explanation
No
Does the sensor part contain any obstructions or blots?
Yes
Clean the filter (see instruction manual). Then provide customer with explanation
No
Does the unit have opportunities to be exposed to direct rays?
Yes
If the unit is exposed to direct rays, keep the unit away from the rays with blocking out rays
No
Are all connectors of sensors connected properly?
No
Modify connections
Yes
<2-①>
Does the output voltage from the controller to the light receiving sensor indicate a normal value? (Controller side)
Abnormal
Replacing the controller (see page 42)
Normal
<2-②>
Does the output voltage from the controller to the light receiving sensor indicate a normal value? (light receiving sensor side)
Abnormal
Replace the light receiving sensor harnesses (see pages 47 - 48)
Normal
<2-③>
Does the output voltage from the light receiving sensor to the controller indicate a normal value? (Controller side)
*With hands laid
Abnormal
Replace the light receiving sensor (see page 44)
Normal
<2-④>
Does the output voltage from the controller to the luminescent sensor indicate a normal value? (Controller side)
Abnormal
Replacing the controller (see page 42)
Normal
<2-⑤>
Does the output voltage from the controller to the luminescent sensor indicate a normal value? (Luminescent sensor side)
Abnormal
Replacing the sensor LED lighting harnesses (see page 46)
Normal
Replacing the luminescent sensor (see page 44)

2. How to inspect

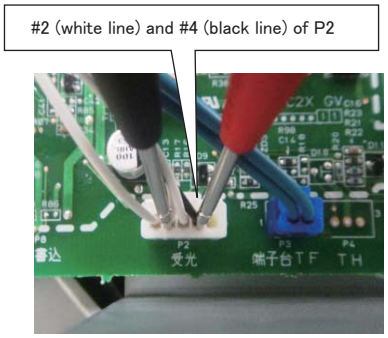
①Check the output voltage to the light receiving sensor

【Controller side : connector P2】
Remove the sub-assembled controller.
(See “Common operation 1” (page 13))

Switch both the circuit breaker and the power to ON “⎓”.
Then measure the voltage at the connector (P2) on the controller, #2 (white line) and #4 (black line).

Measuring range : DCV

	Normal value	Abnormal value
Connector P2: #2 (white line) : #4 (black line)	Approx. 5 V DC	Other than the left



② Check the output voltage to the light receiving sensor

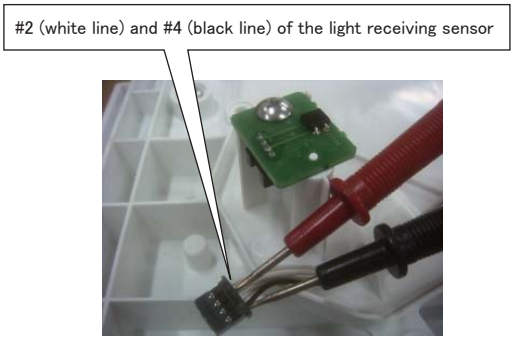
【Light receiving sensor side】
Remove the light receiving sensor cover.
(Replacing the light receiving sensor (see page 44))
Remove the light receiving sensor connector.

Switch both the circuit breaker and the power to ON “⎓”.
Then measure the voltage at the connector on the light receiving sensor, #2 (white line) and #4 (black line).

Measuring range : DCV

	Normal value	Abnormal value
Light receiving sensor connector: #2 (white line) : #4 (black line)	Approx. 5 V DC	Other than the left

*If the power switch is turned ON “⎓” while leaving the light receiving sensor cover off, the dryer unit will operate as it turns in the status of light detection.



2. How to inspect

③Check the input voltage from the light receiving sensor

【Controller side : connector P2】
Remove the sub-assembled controller.
(See "Common operation 1" (page 13))

・Check the output voltage
Switch both the circuit breaker and the power to ON "⎓".
Then measure the voltage at the connector (P2) on the controller, #2 (white) and #4 (black).

Measuring range : DCV

	Normal value	Abnormal value
Connector P2: #2 (white line) : #4 (black line)	Approx. 5 V DC	Other than the left

・ Switch both the circuit breaker and the power to ON "⎓".
Then measure the voltage at the connector (P2) on the controller, #3 (white) and #4 (black).

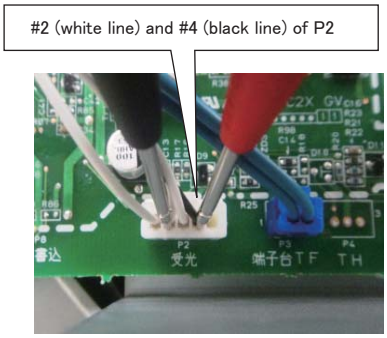
Compare the (output) voltage between #2 (white) and #4 (black).

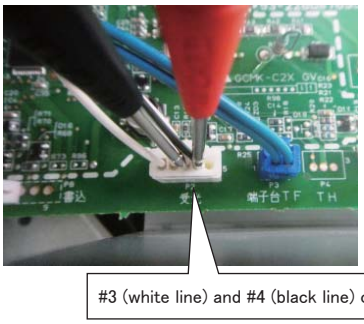
<When hands lay above the sensor> Measuring range : DCV

	Normal value	Abnormal value
Connector (P2): #3 (white line) : #4 (black line)	Output voltage Equivalent to (#2 – #4 voltage)	DC0V

<Reference>
<When keeping hands out from the sensor> Measuring range : DCV

	Normal value	Abnormal value
Connector (P2): #3 (white line) : #4 (black line)	(#2 – #4 voltage) – (Approx. 0.2 V DC)	Equivalent to the output voltage, or 0 V DC





④Check the output voltage to the luminescent sensor

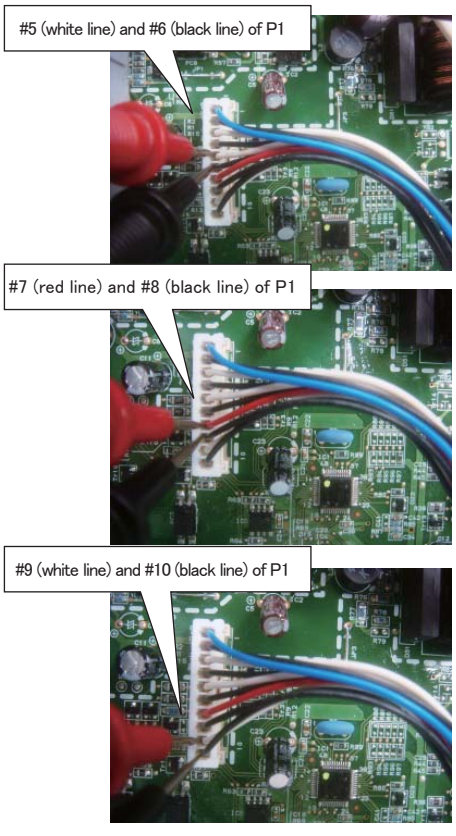
【Controller side : connector P1】
Remove the sub-assembled controller.
(See "Common operation 1" (page 13))

Switch both the circuit breaker and the power to ON "⎓".
Then measure the voltage on the connector (P1) on the controller, each pair of #5 (white line) and #6 (black line), #7 (red line) and #8 (black line), #9 (white line) and #10 (black line).

Measuring range : DCV

	Normal value	Abnormal value
Connector (P1): #5 (white line) #6 (black line)	In the vicinity of 0.15 V DC – 0.7 V DC	Other than the left
Connector (P1): #7 (red line) #8 (black line)		
Connector (P1): #9 (white line) #10 (black line)		

* The measured value varies depending on the type of circuit tester.



2. How to inspect

⑤To check the output voltage to the luminescent sensor

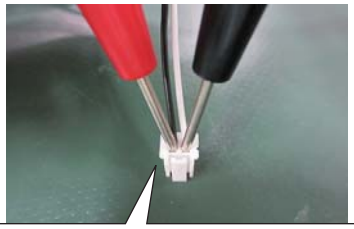
【luminescent sensor side】
Remove the left, right, and center connectors of the luminescent sensor.

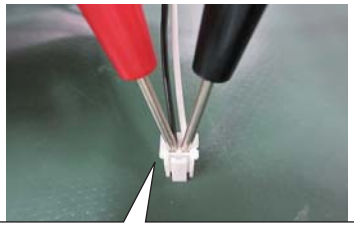
Switch both of the circuit breaker and the power to ON "⎓".
Then measure the voltage at each of the left, right, and center connectors, for #1 and #2.

Measuring range : DCV

	Normal value	Abnormal value
Left connector of the luminescent sensor: #1 (white line) : #2 (black line)	In the vicinity of 0.15 V DC – 0.7 V DC	Other than the left
Right connector of the luminescent sensor : #1 (white line) : #2 (black line)		
Center connector of the luminescent sensor: #1 (red line) : #2 (black line)		

* The measured value varies depending on the type of circuit tester.


Left connector of the luminescent sensor: #1 (white line) and #2 (black line)

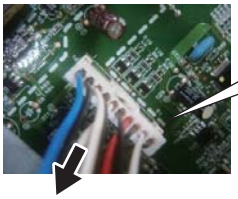

Right connector of the luminescent sensor: #1 (white line) and #2 (black line)

Center connector of the luminescent sensor: #1 (red line) and #2 (black line)

(See "Common operation 1" (page 13))

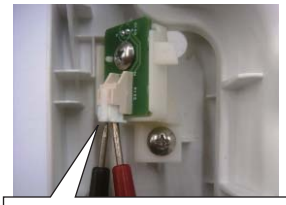
<To confirm luminescent sensor malfunctions>
◆Check the diodes of luminescent sensor
【luminescent sensor side】
Remove the sub-assembled controller.

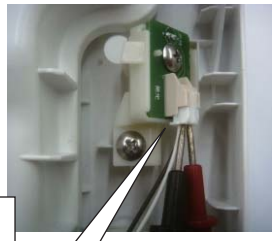
Switch both the circuit breaker and the power to OFF "◎", and unplug the connector (P1) from the controller.
Then measure the diode at each of the left, right, and center connectors, for #1 and #2.


Remove P1

Measuring range : →|←

	Normal value	Abnormal value
Left connector of the luminescent sensor: #1 (white line) : #2 (black line)	Approx. 1.0 V DC	0 V DC (short circuit malfunctioning)
Right connector of the luminescent sensor: #1 (white line) : #2 (black line)		Indications including O.F. or O.L. (malfunctioning)
Center connector of the luminescent sensor: #1 (red line) : #2 (black line)		


Left connector of the luminescent sensor: #1 (white line) and #2 (black line)


Right connector of the luminescent sensor: #1 (white line) and #2 (black line)

*Use a circuit tester with diode check function. (with →|← mark)

*To measure, contact + pin of tester on #1 (white line, red line) and - pin on #2 (black line).

If the tester indicated as "O.F" or "O.L" (means over the range), the polar of tester pins are swapped or wire is broken.
Reverse the pins and measure again.

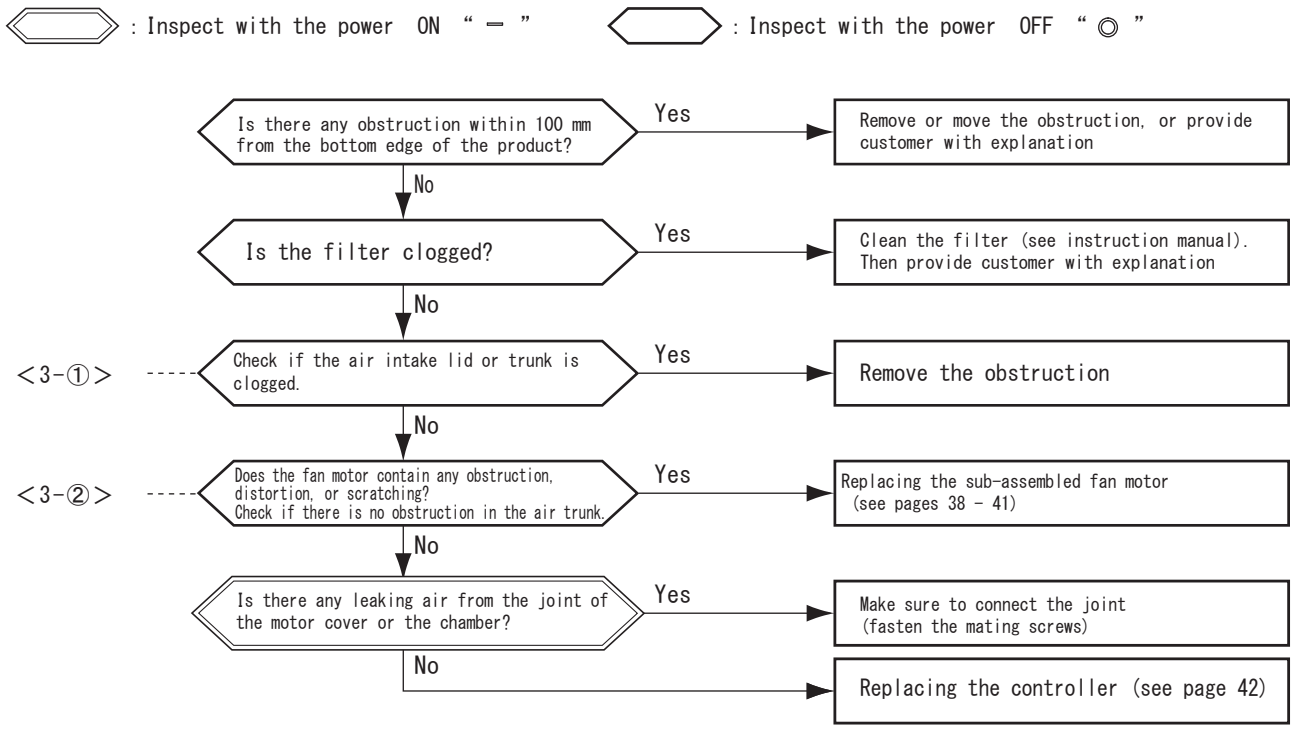
Center connector of the luminescent sensor: #1 (red line) and #2 (black line)

3. The air volume is weak

<Expected malfunction>

1) The fan strength switch is set to LO " ֍ "
2) One of the following might be malfunctioning.

- In the trunks of intake/exhaust air (including filter)
- Fan motor part
- Controller part

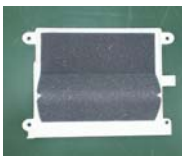

: Inspect with the power ON " ー "
: Inspect with the power OFF " ◎ "
Is there any obstruction within 100 mm from the bottom edge of the product?
Yes
Remove or move the obstruction, or provide customer with explanation
No
Is the filter clogged?
Yes
Clean the filter (see instruction manual). Then provide customer with explanation
No
<3-①>
Check if the air intake lid or trunk is clogged.
Yes
Remove the obstruction
No
<3-②>
Does the fan motor contain any obstruction, distortion, or scratching? Check if there is no obstruction in the air trunk.
Yes
Replacing the sub-assembled fan motor (see pages 38 - 41)
No
Is there any leaking air from the joint of the motor cover or the chamber?
Yes
Make sure to connect the joint (fasten the mating screws)
No
Replacing the controller (see page 42)

3. How to inspect

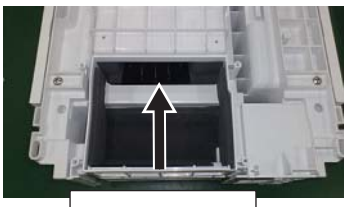
①Check the stacking in the way of intake air

Remove the air intake lid.
(See “Common operation 2” (page 13))
Check if the air intake lid or trunk is clogged.

	Normal value	Abnormal value
Air intake lid the way of intake air	No obstruction	Obstruction exists



Air intake lid



the way of intake air

②Remove the fan motor and check if there is any obstruction

Remove the motor cover and the fan motor.
(Replacing the sub-assembled fan motor (see pages 38 – 41))

・Check if the fan motor contains any distortion or obstruction through holes (×5) on the fan motor.

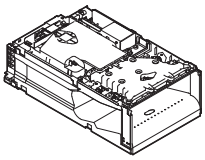
・Rotate the nut on the fan motor with fingers to check if there is any scratching on the fan.

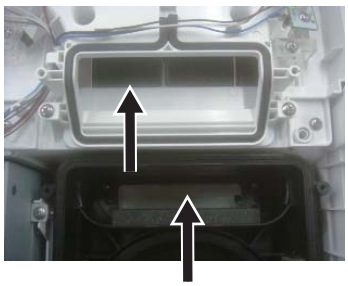
・Check if there is no obstruction in air trunks (×2).

	Normal value	Abnormal value
Inside of the fan motor	No obstruction, distortion or scratching	Obstruction, distortion, or scratching exists
Air trunk	No obstruction	Obstruction exists

Make sure to uninstall the unit and put it with the rear side down. Then start operation.

*Otherwise, fan motor may fall and result in injury or damage.



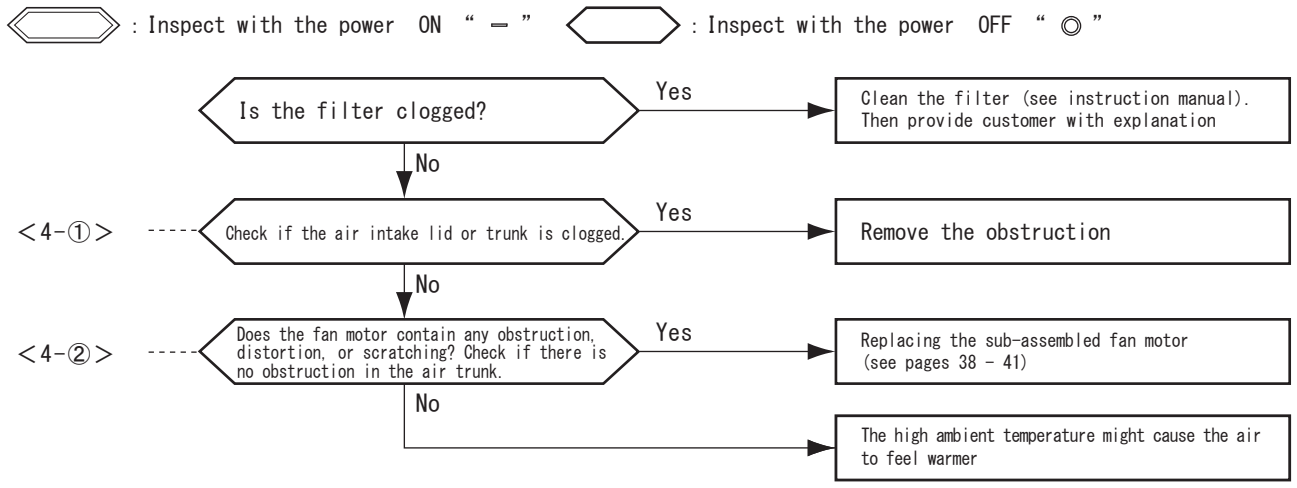


4. Warm air is blown

<Expected malfunction>

One of the following might be malfunctioning.

- fan motor part
- In the trunks of intake/exhaust air(including filter)

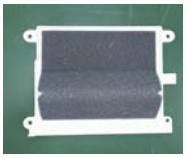

: Inspect with the power ON " — "
: Inspect with the power OFF " ◎ "
Is the filter clogged?
Yes
Clean the filter (see instruction manual). Then provide customer with explanation
No
<4-①>
Check if the air intake lid or trunk is clogged.
Yes
Remove the obstruction
No
<4-②>
Does the fan motor contain any obstruction, distortion, or scratching? Check if there is no obstruction in the air trunk.
Yes
Replacing the sub-assembled fan motor (see pages 38 - 41)
No
The high ambient temperature might cause the air to feel warmer

4. How to inspect

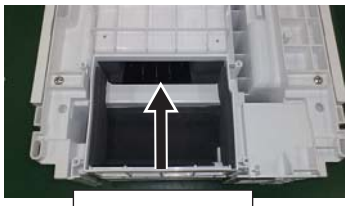
①Check the stacking in the way of intake air

Remove the air intake lid.
(See "Common operation 2" (page 13))
Check if the air intake lid or trunk is clogged.

	Normal value	Abnormal value
Air intake lid the way of intake air	Normal	Abnormal



Air intake lid



the way of intake air

② Remove the fan motor to check if there's no malfunction

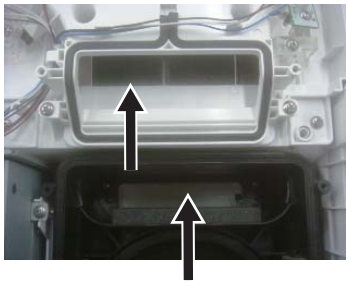
Remove the motor cover and the fan motor.
(Replacing the sub-assembled fan motor (see pages 38 – 41))

- Check if the fan motor contains any distortion or obstruction through holes (×5) on the fan motor.

- Rotate the nut on the fan motor with fingers to check if there is any scratching on the fan.

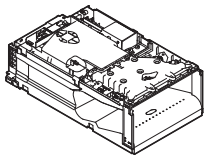
- Check if there is no obstruction in air trunks (×2).

	Normal value	Abnormal value
Inside of the fan motor	No obstruction, distortion or scratching	Obstruction, distortion, or scratching exists
Air trunk	No obstruction	Obstruction exists



Make sure to uninstall the unit and put it with the rear side down. Then start operation.

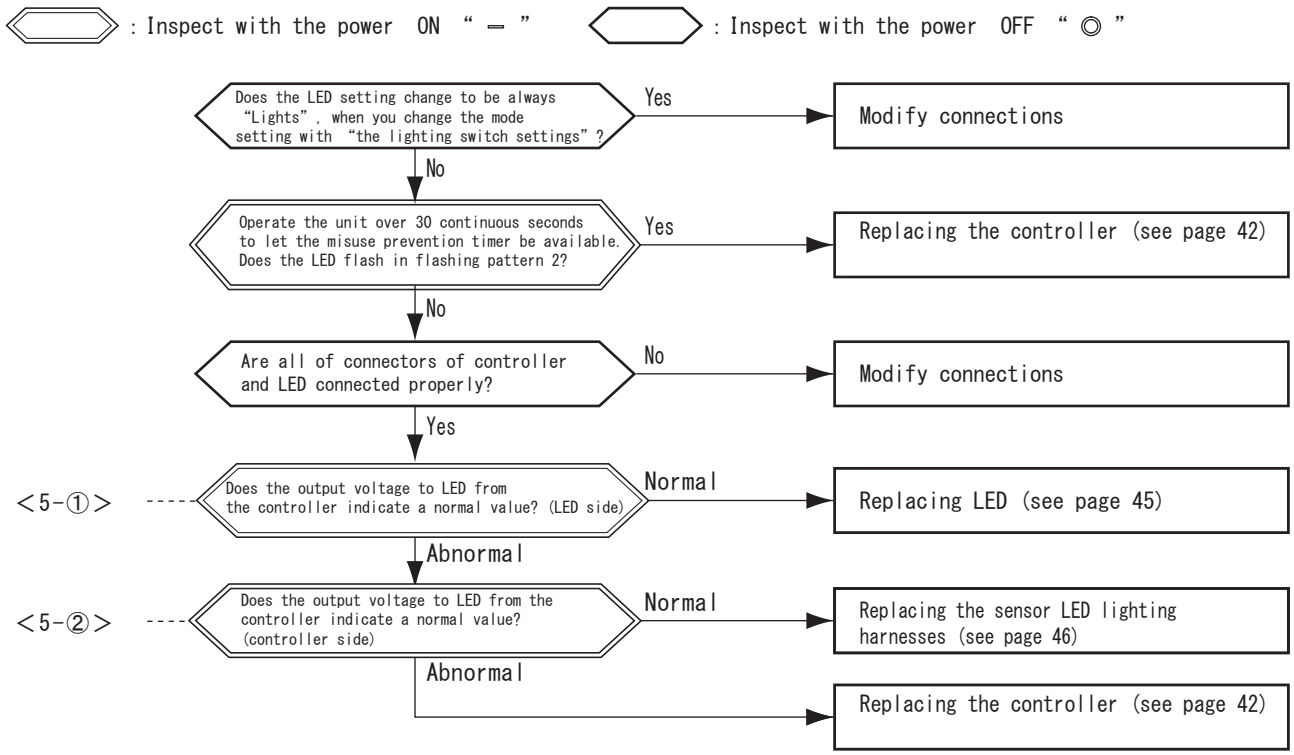
*Otherwise, fan motor may fall and result in injury or damage.



5. LED doesn't light (fan motor does operate)

<Expected malfunction>

1) LED lighting is set to always "No light", by switching "the lighting switch settings".
2) One of the following might be malfunctioning.
   - LED part
   - Controller part


: Inspect with the power ON " — "
: Inspect with the power OFF " ◎ "
Does the LED setting change to be always "Lights", when you change the mode setting with "the lighting switch settings"?
Yes
Modify connections
No
Operate the unit over 30 continuous seconds to let the misuse prevention timer be available. Does the LED flash in flashing pattern 2?
Yes
Replacing the controller (see page 42)
No
Are all of connectors of controller and LED connected properly?
No
Modify connections
Yes
<5-①>
Does the output voltage to LED from the controller indicate a normal value? (LED side)
Normal
Replacing LED (see page 45)
Abnormal
<5-②>
Does the output voltage to LED from the controller indicate a normal value? (controller side)
Normal
Replacing the sensor LED lighting harnesses (see page 46)
Abnormal
Replacing the controller (see page 42)

5. How to inspect

① Check the output voltage to LED lighting

【LED side】

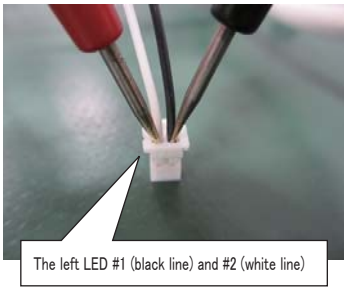
Remove the left and right connectors from LED.
Switch both the circuit breaker and the power to ON "⎓".
Then measure the voltage at each left and right connector, for #1 and #2.

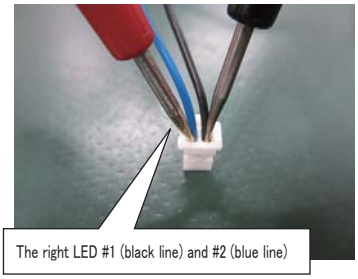
<When hands lay above the sensor> Measuring range : DCV

	Normal value	Abnormal value
LED left connector: #1 (black line) : #2 (white line)	Approximately DC2.9V	Other than the left
LED right connector: #1 (black line) : #2 (blue line)		

<When keeping hands out from the sensor> Measuring range : DCV

	Normal value	Abnormal value
LED left connector: #1 (black line) : #2 (white line)	Approximately DC1.2V	Other than the left
LED right connector: #1 (black line) : #2 (blue line)		





<To confirm LED malfunctioning>
・ Diodes check on LED
Remove the sub-assembled controller.
(See "Common operation 1" (page 13))

Switch both the circuit breaker and the power to OFF "◎", and unplug the connector (P1) from the controller.
Then measure the diode on each of left and right connector, for #1 and #2.

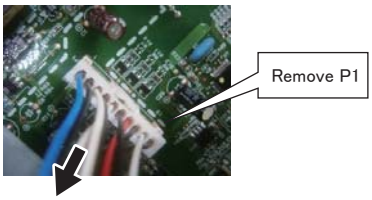
Measuring range : →|←

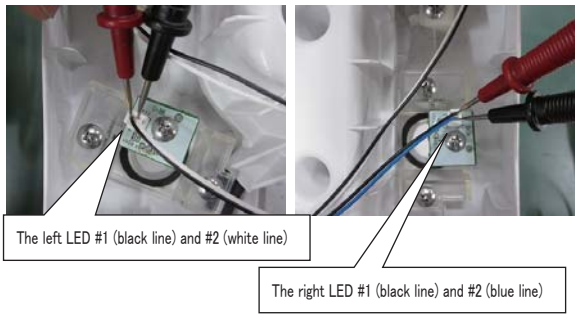
	Normal value	Abnormal value
LED left connector: #1 (black line) : #2 (white line)	Approximately DC1.0V	0 V DC (short circuit malfunctioning)
LED right connector: #1 (black line) : #2 (blue line)		Indications including O.F. or O.L. (malfunctioning)

*Use a circuit tester with diode check function.
(with →|← mark)

*Measure diodes with contacting + pin of tester on #1 (black line) and - pin on #2 (white/blue line).

If the tester indicated as "O.F." or "O.L." (means over the range), the polarity of tester pins is swapped or wire is broken.
Reverse the pins and measure again.





5. How to inspect

② Check the output voltage to LED lighting

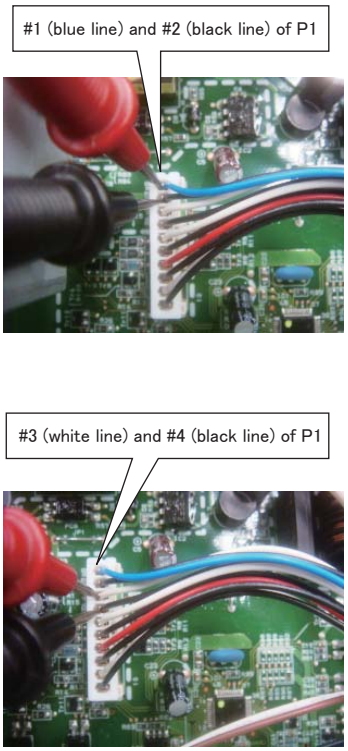
【Controller side : connector P1】
Remove the sub-assembled controller.
(See “Common operation 1” (page 13))
Switch both the circuit breaker and the power to ON “⎓”.
Then measure the voltage at the connector (P1) on the controller, each pair of #1 (blue line) and #2 (black line), #3 (white line) and #4 (black line).

<When hands lay above the sensor> Measuring range : DCV

	Normal value	Abnormal value
Connector (P1): #1 (blue line) : #2 (black line)	Approximately DC2.9V	Other than the left
Connector P1: #3 (white line) : #4 (black line)		

<When keeping hands out from the sensor> Measuring range : DCV

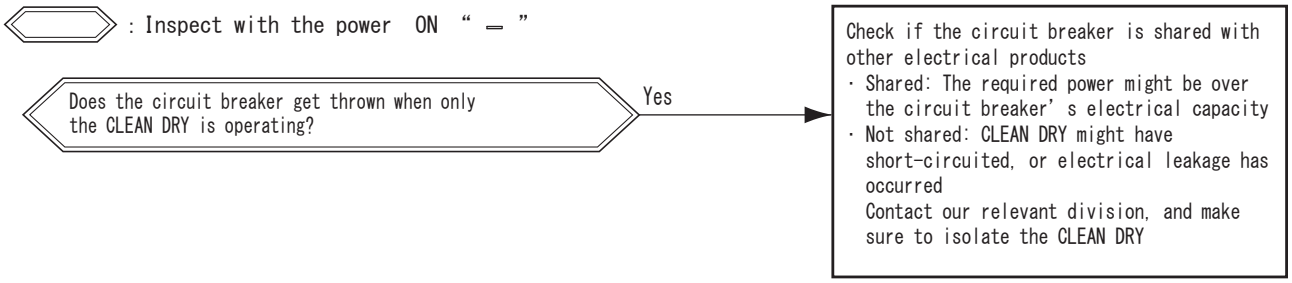
	Normal value	Abnormal value
Connector (P1): #1 (blue line) : #2 (black line)	Approximately DC1.2V	Other than the left
Connector P1: #3 (white line) : #4 (black line)		



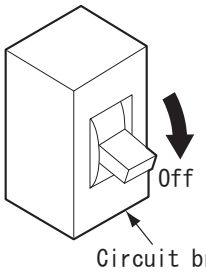
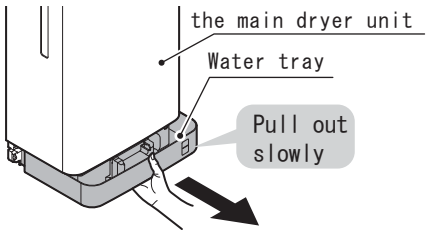
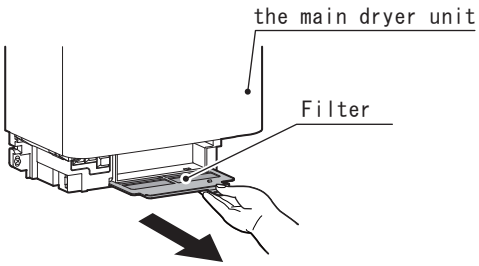
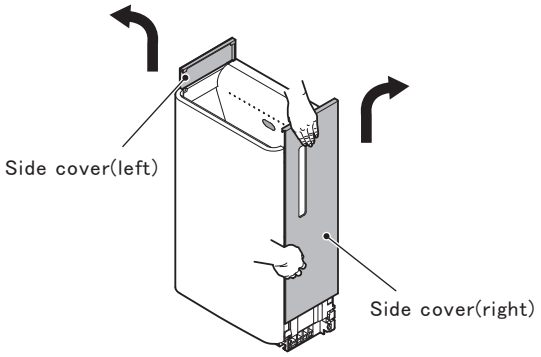
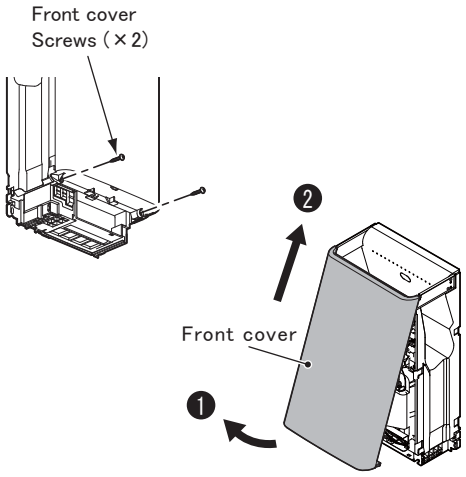
6. The circuit breaker is thrown

<Expected malfunction>

1) Short-circuit, or earth leakage has occurred.

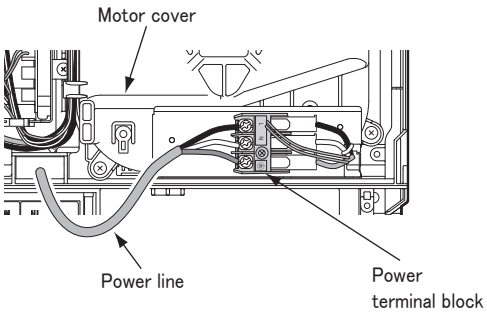

: Inspect with the power ON " — "
Does the circuit breaker get thrown when only the CLEAN DRY is operating?
Yes
Check if the circuit breaker is shared with other electrical products
· Shared: The required power might be over the circuit breaker' s electrical capacity
· Not shared: CLEAN DRY might have short-circuited, or electrical leakage has occurred
Contact our relevant division, and make sure to isolate the CLEAN DRY

12 How to replace each part

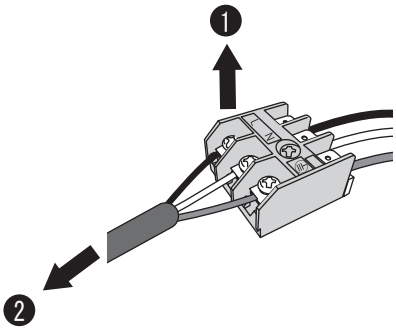
	How to replace	
[Common operation A] <Remove the side cover>		1. Turn the circuit breaker “OFF”. For safety · With the power switch “ON” and lay hands on the part to insert hands to confirm the unit doesn’t operate.
		2. Remove the water tray. Pull the water tray out slowly to remove it from the main dryer unit.
		3. Remove the filter. Pull the filter toward the body to remove it from the main dryer unit.
		4. Remove both right and left side covers. Clamp the top edge of the side covers, and pull the cover upward to remove it in outward direction.
[Common operation B] <Remove the front cover>		Remove the front cover screws (×2) with the vandal resist hex wrench and remove the front cover. [How to remove the front cover] Pull the bottom part of the front cover to the body, and move the cover upward to the top of the product then remove it.

[Common operation C] <uninstall the main dryer unit>

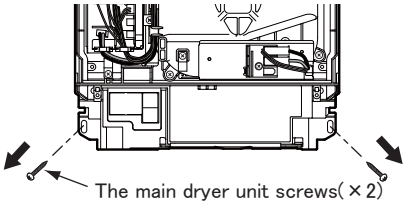
How to replace



1. Remove the clamp screw (×1) from the motor cover.
2. Loosen the electric cable screws (×3) on the power terminal block and pull the power lines (×2) and the ground wire (×1) out.

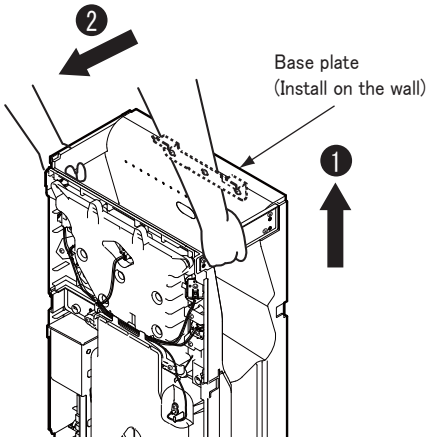


3. Remove the main dryer unit screws (×2) from the bottom of the unit.



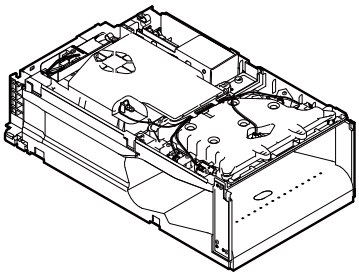
4. Uninstall the main dryer unit from the base plate.

[How to uninstall the product]



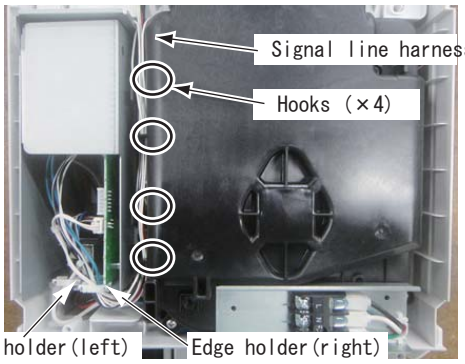
1. Hold up the product,
2. and remove it while pulling it out slowly toward the body.

When putting the product down, place it with the rear side down.



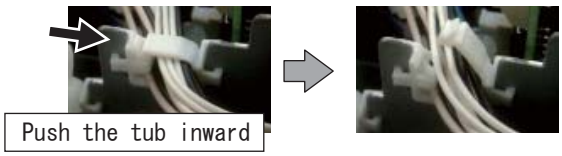
[Common operation D] <Removing the sub-assembled controller>

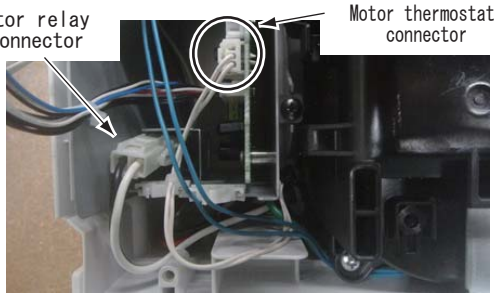
How to replace



1. Remove the signal line harness from the edge holder (right).

[How to remove the edge holder]

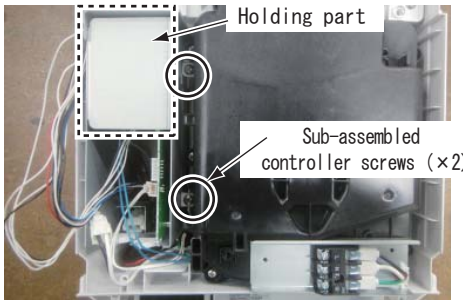




2. Remove the signal line harness from the hooks on the motor cover.

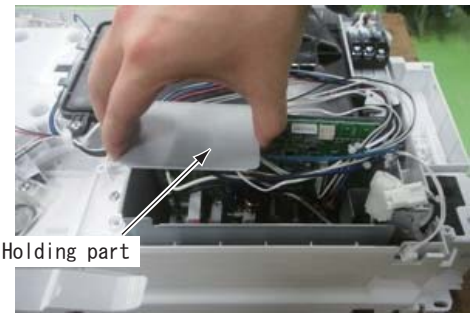
3. Remove the motor power line harness from the edge holder (left), then remove motor relay connector and motor thermostat connector.

4. Remove the sub-assembled controller screws (×2).

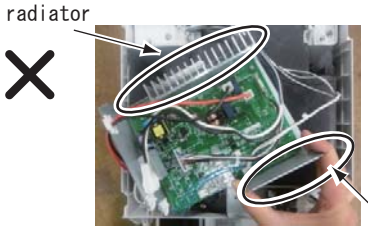


5. Hold the holding part on sub-assembled controller and remove it slowly. Then incline the controller to place on the motor cover.

◆Point
- Never pull harnesses with force.
- Never hold the heat radiator.

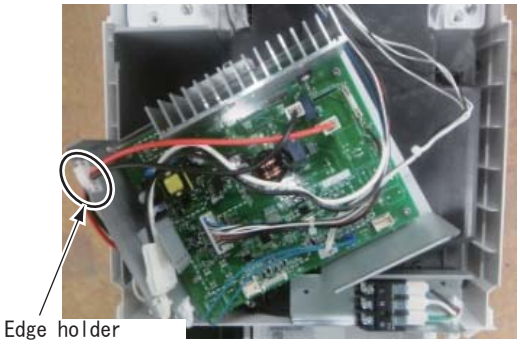


Heat radiator



6. Remove the harness from the edge holder.

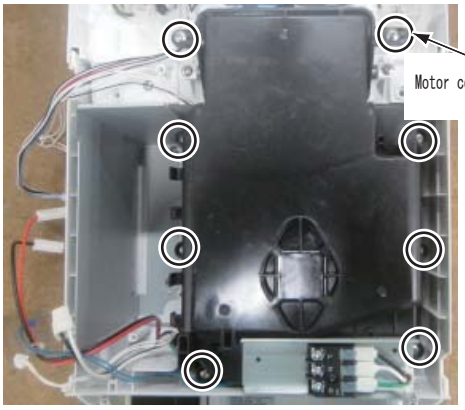
7. Remove all connectors from the sub-assembled controller.

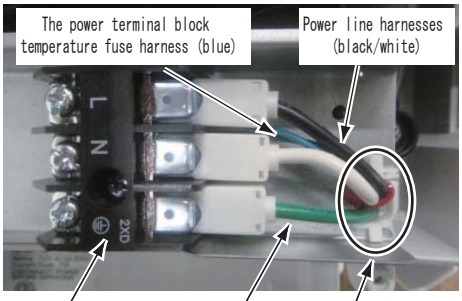


◆Point
- Remove the connector while holding the holding part.
- Never apply force to the elements on the controller.
- Never hold the heat radiator.

[Common operation E] <Removing the motor cover>

How to replace





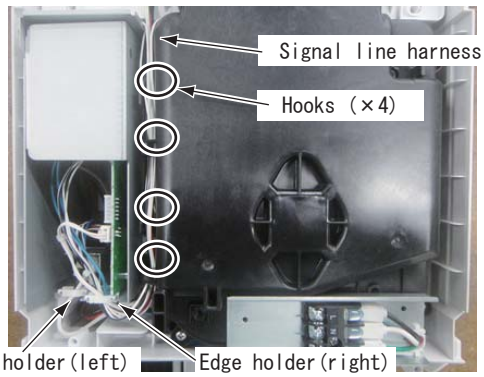
1. Remove the motor cover screws (×8).
2. Remove the power terminal block temperature fuse harness, the power line harness and the ground wire from the edge holder.
3. Remove the motor cover, and place the cover face down beneath the product.

Make sure to place the product with the rear side down before starting operation.

*Otherwise, the sub-assembled fan motor may fall and result in injury or damage.

<Replacing the sub-assembled fan motor>

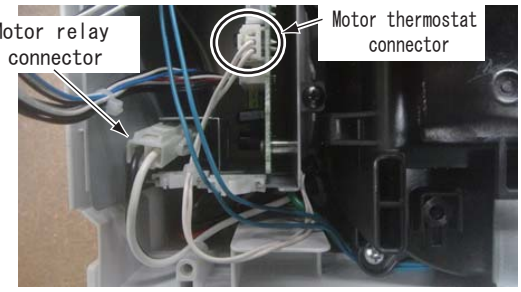
How to replace



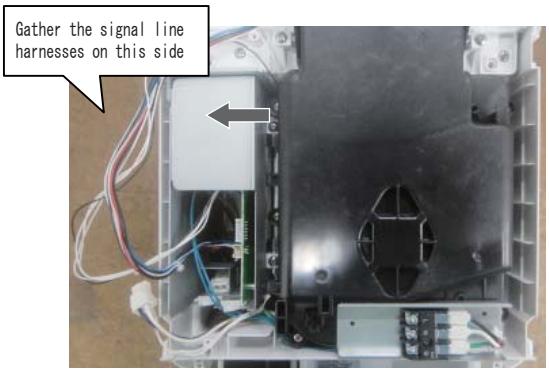
1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35))

2. Remove the signal line harness from the edge holder (right).

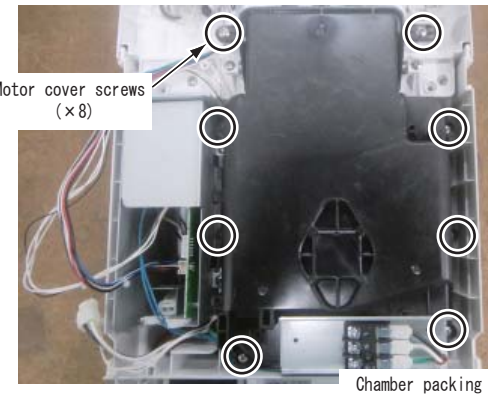
3. Remove the signal line harness from hooks (×4) on the motor cover.



4. Remove the motor power line harness from the edge holder (left), then remove motor relay connector and motor thermostat connector.



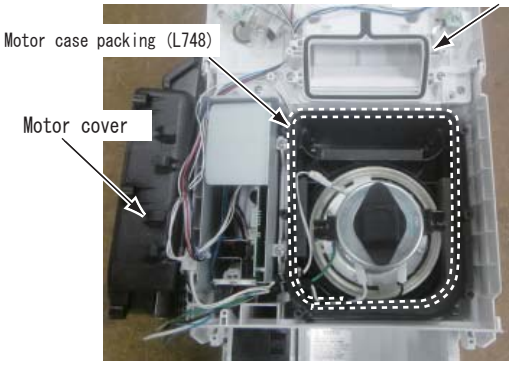
5. Gather the signal line harnesses as shown in the left.



6. Remove the motor cover screws (×8) and remove the motor cover.

7. Place the removed motor cover beside the main dryer unit, shown as in the left.

◆Point
・Be careful not to hang harnesses

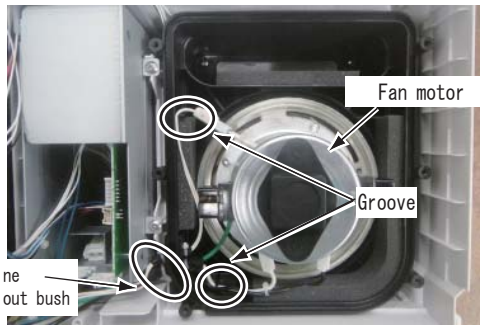


8. Remove the motor case packing (L748) and chamber packing (L374).

【Continue to the next page】

<Replacing the sub-assembled fan motor>

How to replace

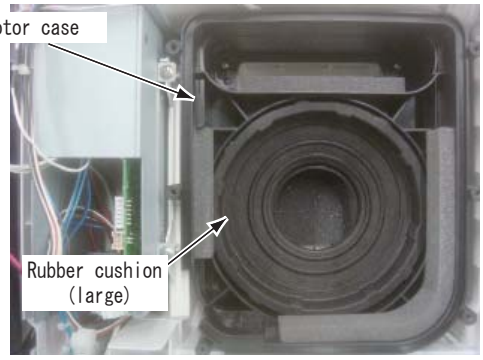


9. Remove the harness from the grooves (×2) and remove the motor line drawing out bush.

10. Remove the harness from the motor line drawing out bush.

11. Remove the fan motor.

12. Remove the rubber cushion (large).



<Process to mount the sub-assembled fan motor>

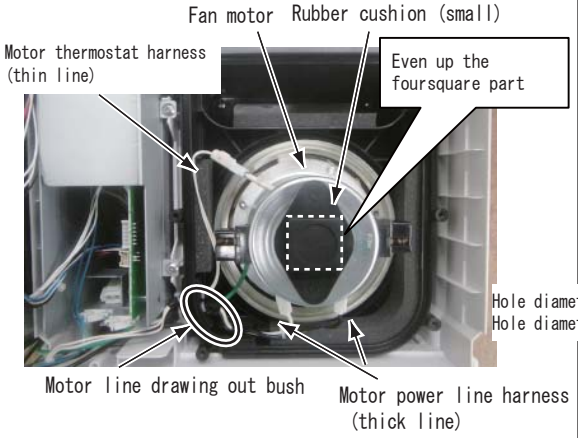
1. Place the rubber cushion (large) on the motor case, then fit up the fan motor.

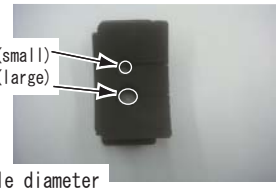
◆Point
・Place the fan motor with the motor power line harnesses (thick line: white/black) down.

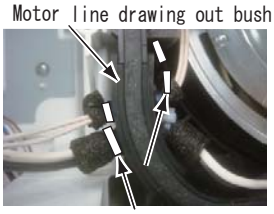
2. Put the rubber cushion (small) on the fan motor.

3. Mount the harness on the motor line drawing out bush.

◆Point
・Fit motor power line harness (thick line) in the hole of larger diameter.
・Put the motor line drawing out bush between banding bands (eptsealer part).




Motor line drawing out bush
Hole diameter (small)
Hole diameter (large)
Hole diameter
Small : Motor thermostat harness (thin line)
Large : Motor power line harness (thick line)



4. Mount the motor line drawing out bush on the motor case.

◆Point
・Confirm that motor line drawing out bush does not stand out from the motor case.
＊Those parts will cause the air leaking from the aperture and result in lower air speed.
＊Abnormal noise might occur.

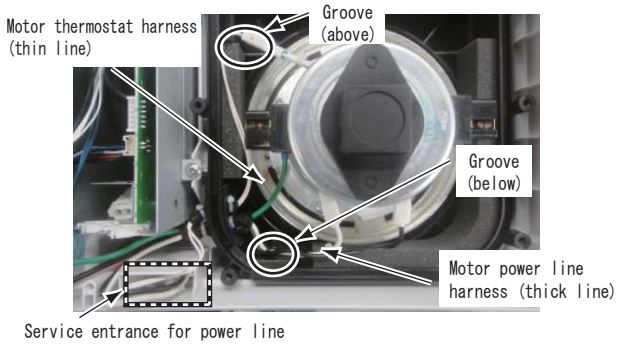
5. Adjust the angle of the fan motor.

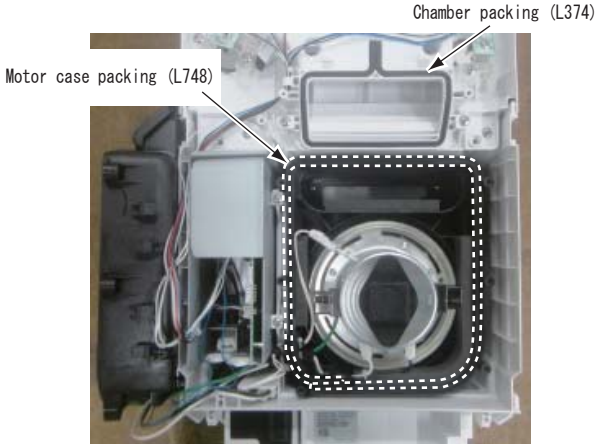
◆Point
・Even up the foursquare part of rubber cushion (small).
＊If the part is not even level, motor cover could not be attached.

【Continue to the next page】

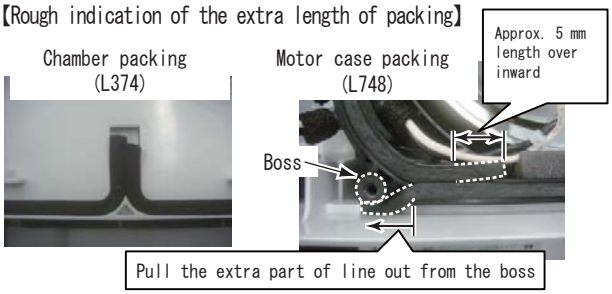
<Replacing the sub-assembled fan motor>

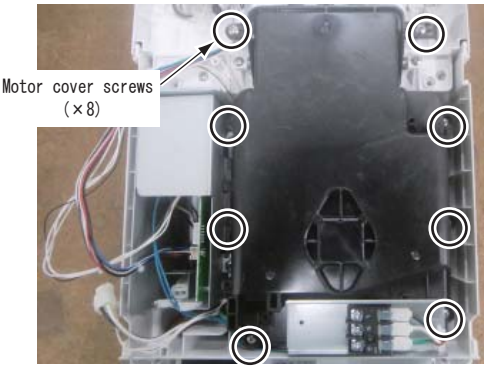
How to replace


Motor thermostat harness (thin line)
Groove (above)
Groove (below)
Motor power line harness (thick line)
Service entrance for power line



【Rough indication of the extra length of packing】


Chamber packing (L374)
Motor case packing (L748)
Approx. 5 mm length over inward
Boss
Pull the extra part of line out from the boss



6. Hook the harnesses in the grooves (×2) on the motor case.
   - Groove (above): Motor thermostat harness (thin line)
   - Groove (below): Motor power line harness (thick line)

7. Put motor thermostat harness and motor power line harness into the power line inlet.

8. Mount the motor case packing (L748) and the chamber packing (L374).

◆ Point
- Fit the packing by squeezing, not pulling.
- Confirm that there is no part of packing that is standing out, distorted, or running off.

＊ Those parts will cause the air to leak from the aperture and result in lower air speed.
＊ Abnormal noise might occur.

9. Put motor cover on, then fix the cover with screws (×8).

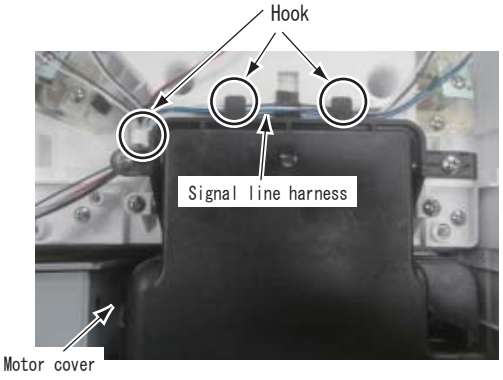
◆ Point
- Confirm that no part of harness is pinched.

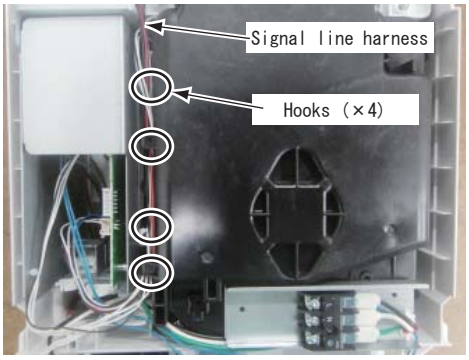
＊ Fixing screws with bad connection may cause air leaking during the unit operation, abnormal noise, or damage parts.

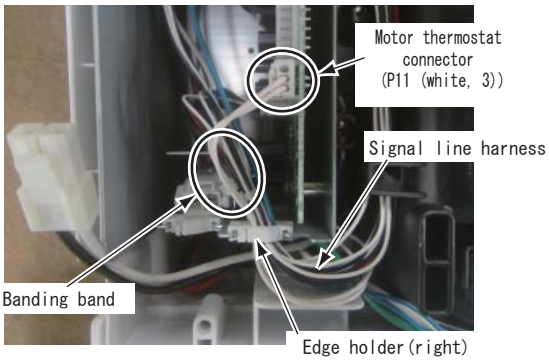
【Continue to the next page】

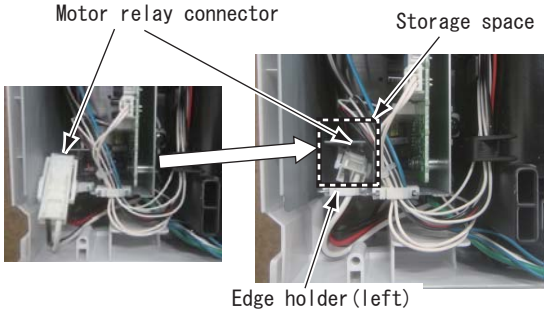
<Replacing the sub-assembled fan motor>

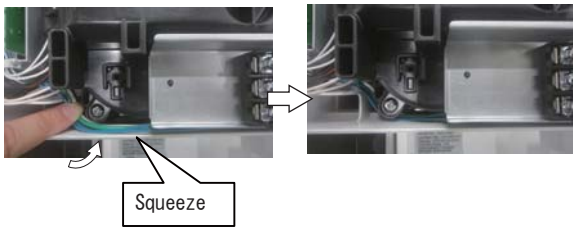
How to replace











10. Hook the signal line harness on hooks (×3) of the motor cover.
    - Sensor LED ligting harnesses (only for luminescent sensor (right), LED (right))

11. Hook the signal line harness on hooks (×4) on the left side of the motor cover.
    - Light receiving sensor harnesses
    - Sensor LED lighting harnesses

12. Connect the motor thermostat connector with the sub-assembled controller.
    - P11 (white, 3 pin)

13. Fit the signal line harness in the edge holder (right).
    - Motor thermostat harness
    - Power terminal block temperature fuse harness
    - Harnesses of the step 11

◆ Point
- When fitting the banding bands attached to the harness, it should stay nearer to the sub-assembled controller than the edge holder.
- Fit the extra part of signal line harness in the sub-assembled controller.

14. Connect the motor relay connector.

15. Fit the motor power line harness (thick line: black/white) in the storage space, then put it in the edge holder (left).

◆ Point
- As shown in the left, motor relay connector should stay nearer to the sub-assembled controller than the edge holder.

16. Squeeze the power terminal block temperature fuse harness and power line harness into the back side of the motor case.

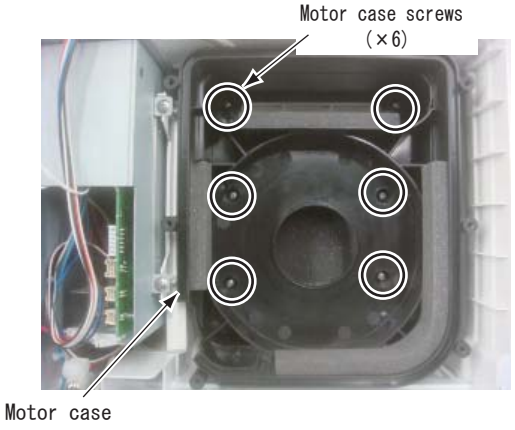
◆ Point
- Be careful not to pinch the power terminal block temperature fuse harness and power line harness with the power terminal block and the front cover.

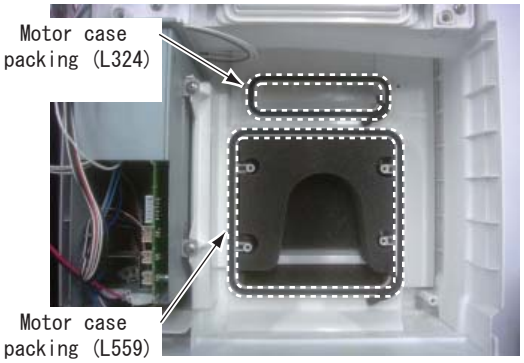
【Continue to the next page】

	How to replace	
〈Replacing the sub-assembled controller〉		1. Remove the side covers and the front cover, then uninstall the main dryer unit. Remove the sub-assembled controller. (Common operation A, B, C, D (see pages 34 - 36)) 2. Once replacing sub-assembled controller is finished, check the main unit operation, referring to “How to organize cables”. (See pages 52 - 55) ◆ Point ・Confirm that no part of harness is pinched. ・Never apply force to the elements on the base plate. ・Never hold the heat radiator.

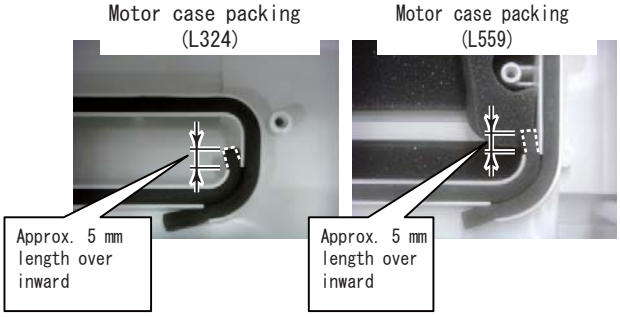
How to replace

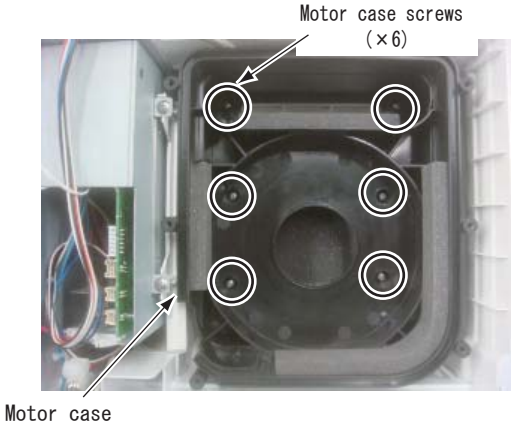
〈Replacing the motor case〉





[Rough indication of the extra length of packing]





1. Remove the side covers and the front cover, then uninstall the main dryer unit.
   (Common operation A, B, C (see pages 34 - 35))

2. Complete steps 2 to 13 of “Replacing sub-assembled fan motor”. (See pages 38 - 39)

3. Remove the motor case screws (×6) and remove the motor case.

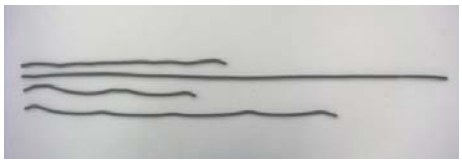
4. Remove the motor case packing (L324) and (L559).

〈Process of mounting the motor case〉

1. Mount the motor case packing (L324) and (L559) on the main unit case.
   ◆ Point
   - Fit the packing by squeezing, not pulling.
   - Confirm that no part of packing is standing out, distorted, or running off.

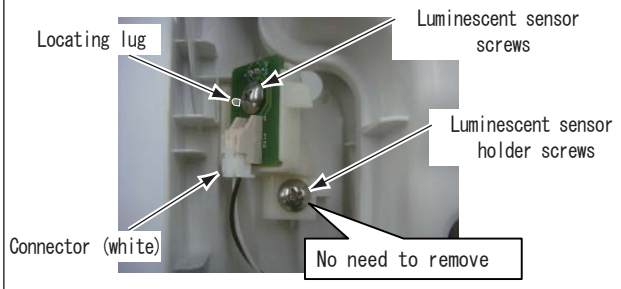
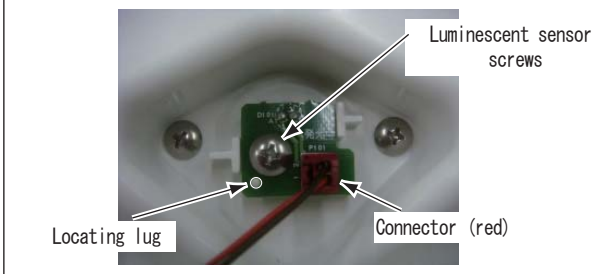
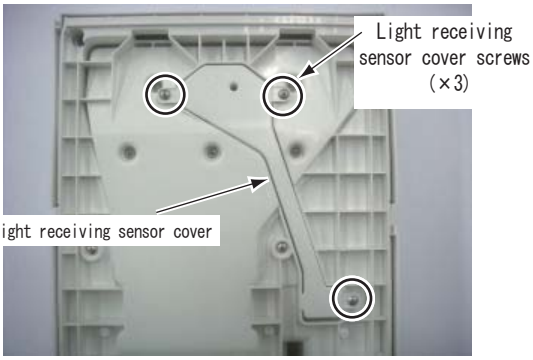
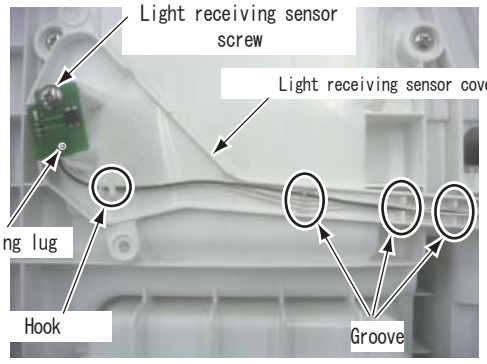
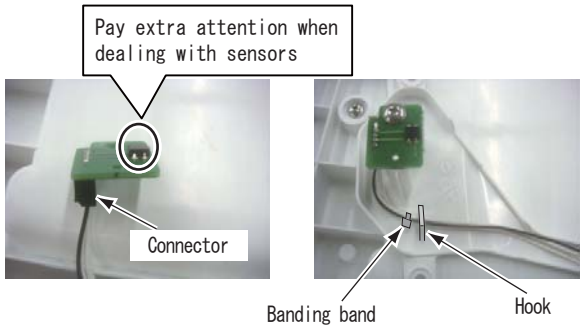
Those parts will cause air to leak from the aperture and result in lower air speed. Abnormal noise might occur.

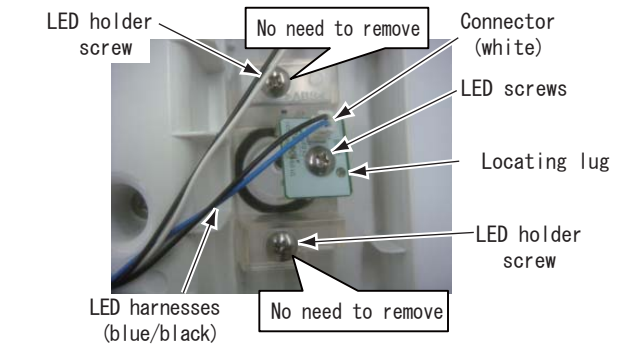
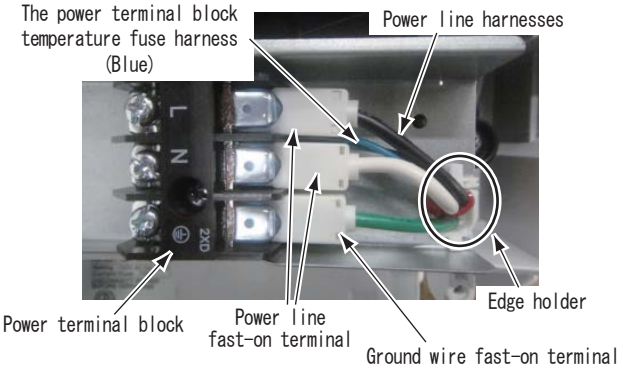
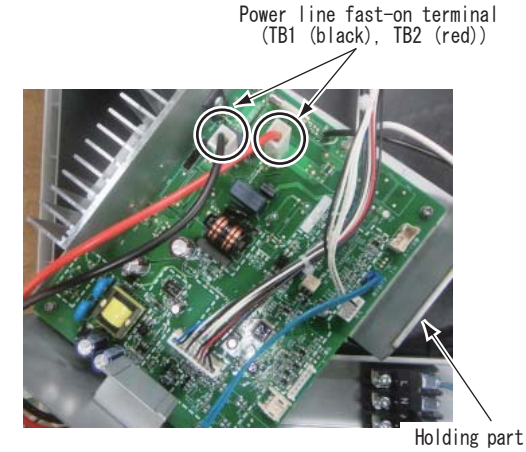
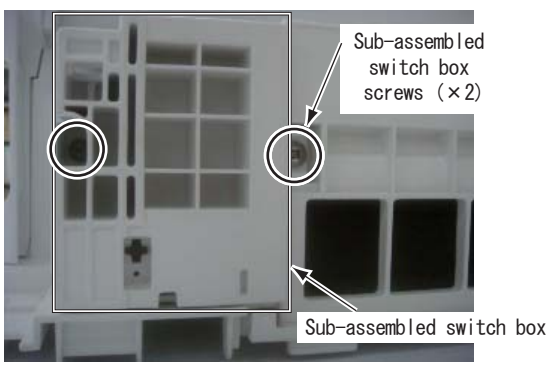
Be careful not to mix up packing. From the top:
- Chamber packing (L374)
- Motor case packing (L748)
- Motor case packing (L324)
- Motor case packing (L559)



2. Fix the motor case screws (×6).

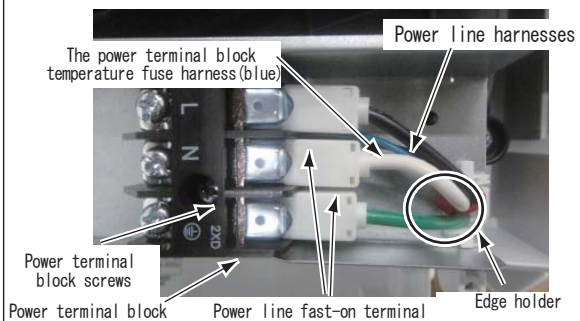
3. Refer to the mounting process on “Replacing sub-assembled fan motor” to assemble. (See pages 39 - 41)

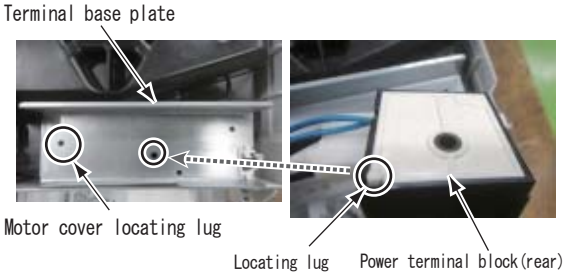
	How to replace	
<Replace the luminescent sensor>	■Luminescent sensor (left and right parts)  ■Luminescent sensor (center part)  	1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35)) 2. Remove connectors from the luminescent sensor. 3. Remove the luminescent sensor screw (×1) and remove the luminescent sensor. ◆ Point ・Do not remove the luminescent sensor holder screw (×1). 4. Replacing the luminescent sensor. 5. Assemble by reversing the steps, and check the unit operation. ◆ Point ・Align holes on the luminescent sensor at the locating lug to assemble. Mislocating the luminescent sensor may disable hand detection.
<Replace the light receiving sensor>	   	1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35)) 2. Mat a curing sheet, then place the product with its rear side up on the sheet. 3. Remove the Light receiving sensor cover screws (×3) and remove the Light receiving sensor cover. 4. Remove the Light receiving sensor harness from the hook. 5. Remove the Light receiving sensor screw (×1) and remove the light receiving sensor. 6. Remove a connector from the light receiving sensor. 7. Replace the light receiving sensor. 8. Assemble by reversing the steps, and check the unit operation. ◆ Point ・Assemble with the sensor part facing up. ・Align holes on the Light receiving sensor the locating lug to assemble. Mislocating the luminescent sensor may disable hand detection. ・When fixing screws, be careful to keep driver away from the sensor. ・When attaching the Light receiving sensor cover, be careful to keep the sensor part away from other parts. Contact can break the sensor and lead to malfunction. ・Be careful not to pinch harnesses. ・Place the banding band nearer to the light receiving sensor than hook.

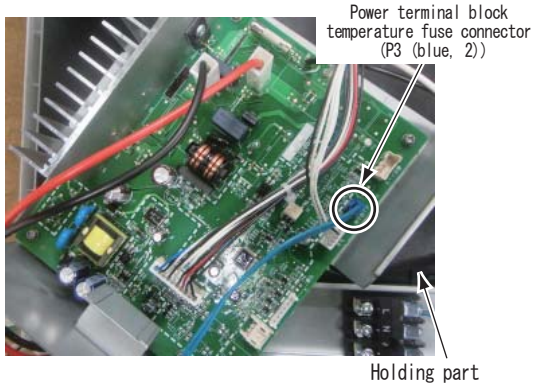
	How to replace	
〈Replacing LED〉		1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 39 - 40)) 2. Remove a connector from LED. 3. Remove the LED screw (×1) and remove the LED. ◆ Point ・ Do not remove the LED holder screws (×2). 4. Replace the LED. 5. Assemble by reversing the steps, and check the unit operation. ・ Align holes on the LED at the locating lug to assemble.
〈Replacing the sub-assembled switch box〉	  	1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35)) 2. Remove the power terminal block temperature fuse harness and power line harness from the edge holder. 3. Remove the power line fast-on terminal and the grand wire fast-on terminal from the power terminal block. 4. Complete the step 1 to 6 of “Remove the sub-assembled controller”. (See “Common operation D” (page 36)) 5. Remove the power line fast-on terminal from the sub-assembled controller. ・ TB1 (black) ・ TB2 (red) ◆Point ・ Remove the connector by holding the holding part on the sub-assembled controller. 6. Remove the sub-assembled switch box screws (×2) and remove the sub-assembled switch box. 7. Replace the sub-assembled switch box. ◆Point ・ Be careful not to pinch the harnesses when attaching the sub-assembled switch box. 8. After assembling, check the main unit operation referring to “How to organize cables”. (See pages 52 - 55)

How to replace

< Replacing the power terminal block>

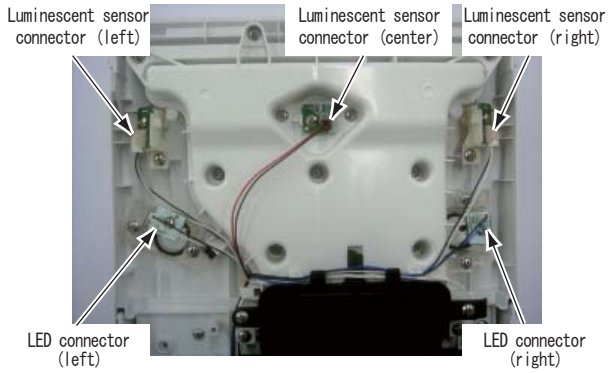


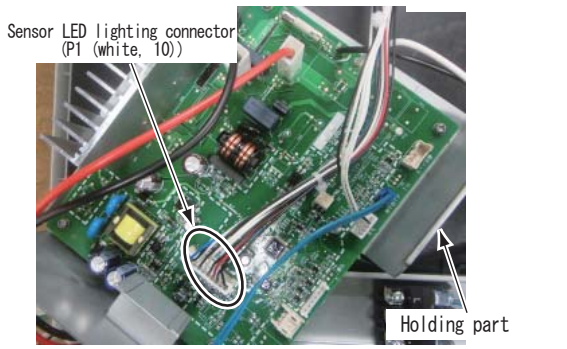




1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35))
2. Remove the power terminal block temperature fuse harness and power line harness from the edge holder.
3. Remove the power line fast-on terminal and the ground wire fast-on terminal from the power terminal block.
4. Remove the power terminal block screw (×1), and replace the power terminal block.
   ◆Point
   - Confirm that the locating lug of the motor cover is properly inside the hole on the terminal base plate.
   - Fit the locating lug on the rear side of the terminal block at the given location on the terminal base plate to fix the terminal block.
5. Complete steps 1 to 5 of "Remove the sub-assembled controller". (See "Common operation D" (page 36))
6. Remove connectors from the power terminal block temperature fuse.
   - P3 (blue, 2 pin)
   - Remove the connector by holding the holding part on the sub-assembled controller.
7. After assembling, check the main unit operation referring to "How to organize cables". (See pages 52 - 55)

<Replacing the sensor LED lighting harness>



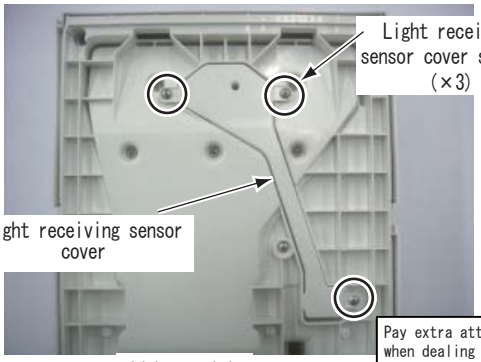


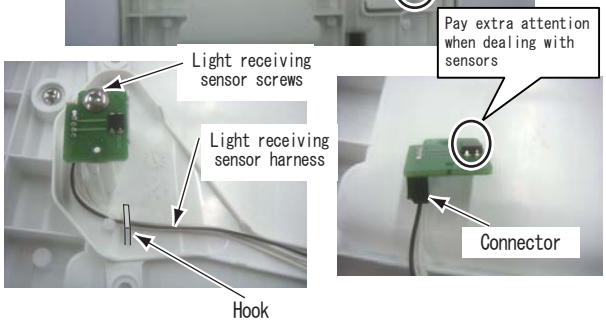
1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35))
2. Remove connectors from luminescent sensor (left/right/center) and LED (left/right), then replace the sensor LED lighting harness.
3. Complete steps 1 to 5 of "Removing the sub-assembled controller". (See "Common operation D" (page 36))
4. Remove connectors from the sensor LED lighting.
   - P1 (white, 10 pin)

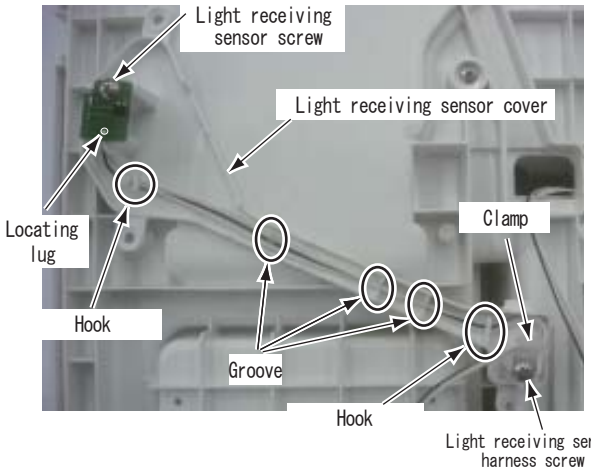
   ◆Point
   - Remove the connector by holding the holding part on the sub-assembled controller.
5. After assembling, check the main unit operation referring to "How to organize cables". (See pages 52 - 55)

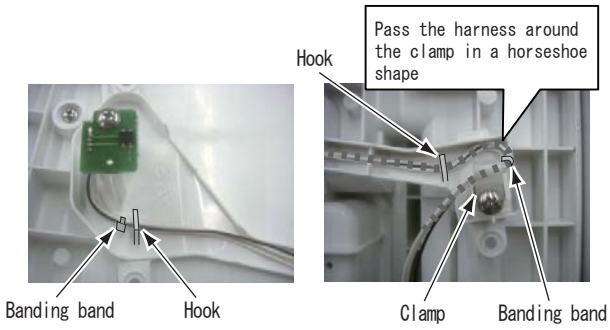
How to replace

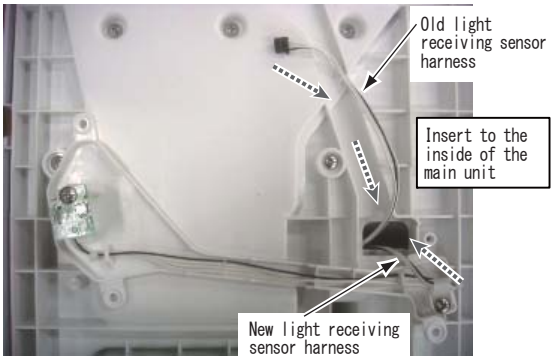
〈Replacing Light receiving sensor harness〉











1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35))

2. Mat a curing sheet, then place the product with its rear side up on the sheet.

3. Remove the light receiving sensor cover screws (×3) and remove the light receiving sensor cover.

4. Remove the light receiving sensor harness from the hook.

5. Remove the light receiving sensor screw (×1) and remove the light receiving sensor.

6. Remove a connector from the light receiving sensor

7. Remove the light receiving sensor harness screw (×1) and remove the clamp.

8. Remove the light receiving sensor harness from the grooves (×3) and hook.

Attach the new harness for light receiving sensor, as the harness is still connected to the sub-assembled controller.

〈Process to attach light receiving sensor harness〉

1. Connect the connector of light receiving sensor harness to the light receiving sensor.

2. Mount the light receiving sensor on the light receiving sensor cover with light receiving sensor screw (×1).
   ◆Point
   - Assemble with the sensor part facing up.
   - Align holes on the light receiving sensor at the locating lug to assemble. Mislocating the luminescent sensor may disable hand detection.
   - When fixing screws, be careful to keep driver away from the sensor. Contact will break the sensor, resulting in malfunction.

3. Hook light receiving sensor harnesses on hooks (×2), then pass the harness around the clamp in a horseshoe shape. Then fix it with light receiving sensor screw (×1).
   ◆Point
   - Be aware of where to attach the banding band to the harness.

4. Fit the light receiving sensor harness on grooves (×3).

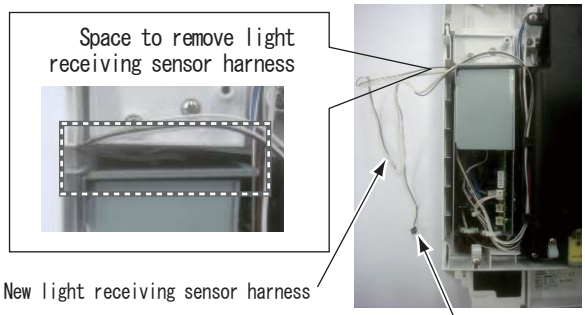
5. Put both new and old harnesses for the light receiving sensor into the inside of the main unit.

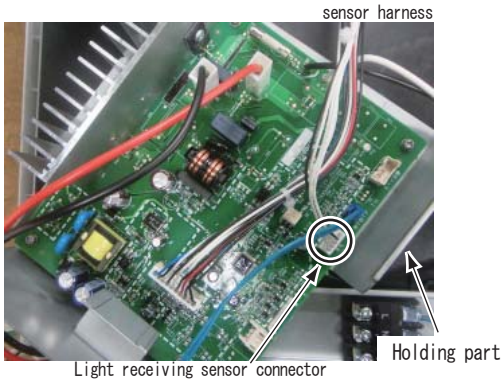
6. Mount the light receiving sensor cover on the main unit case with light receiving sensor screws (×3).
   ◆Point
   - When attaching the light receiving sensor cover, becareful to keep the sensor part away from other parts. Contact will break the sensor, resulting in malfunction.
   - Be careful not to pinch harnesses.

【Continue to the next page】

How to replace

<Replacing Light receiving sensor harness>


Space to remove light receiving sensor harness
New light receiving sensor harness
Old light receiving sensor harness



7. Put the product with its rear side down.

8. Withdraw the light receiving sensor harness slowly, then put it outside of the product.

9. Complete steps 1 to 5 of "Remove the sub-assembled controller". (See "Common operation D" (page 36))

10. Remove the light receiving sensor connector from the sub-assembled controller, then remove the old light receiving sensor harness.
    - P2 (white, 5 pins)

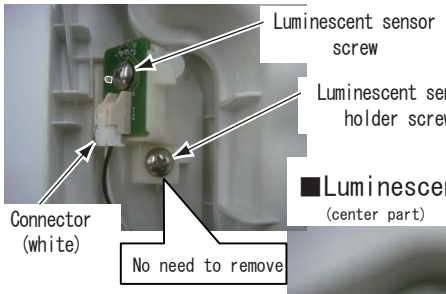
    ◆Point
    - Remove the connector by holding the holding part on the sub-assembled controller.

11. Replace the light receiving sensor harness.

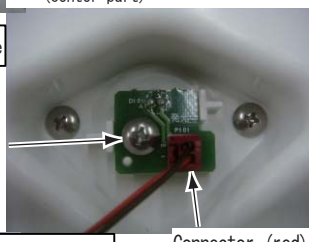
12. After assembling, check the main unit operation referring to "How to organize cables". (See pages 52 - 55)

<Replacing the sub-assembled drying compartment A>

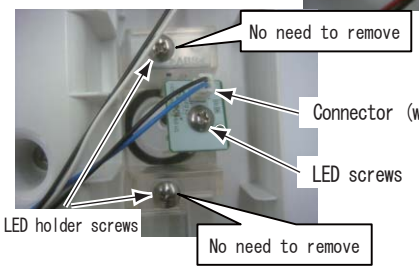
■Luminescent sensor (left and right parts)

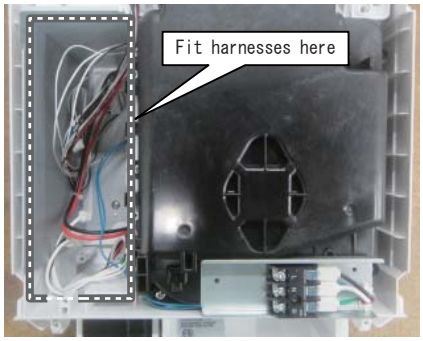


■Luminescent sensor (center part)



■LED (left and right part)





1. Remove the side covers and the front cover, then uninstall the main dryer unit. (Common operation A, B, C (see pages 34 - 35))

2. Remove connectors from luminescent sensor and LED, then remove the sensor LED lighting harness.

3. Remove the luminescent sensor screw (×1) and remove the luminescent sensor.

   ◆Point
   - Do not remove the luminescent sensor holder screw (×1).

4. Remove the LED screw (×1) and remove the LED.

   ◆Point
   - Do not remove the LED holder screws (×2).

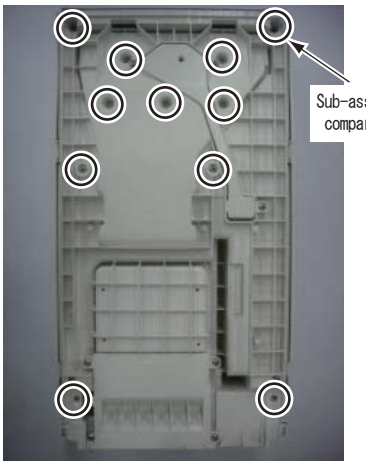
5. Fit harnesses into the sub-assembled controller insertion part.

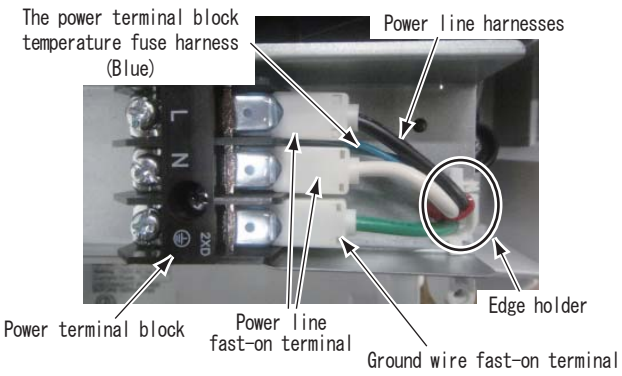
   ◆Point
   - Fit the harnesses not to hang out of the space indicated on the left. In step 6, harness might be pinched when the product is reversed.

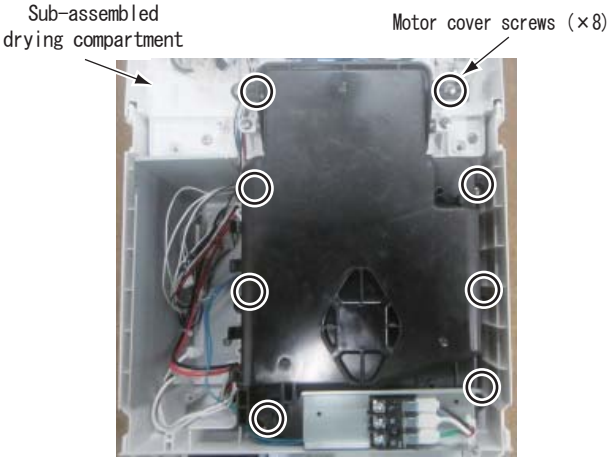
【Continue to the next page】

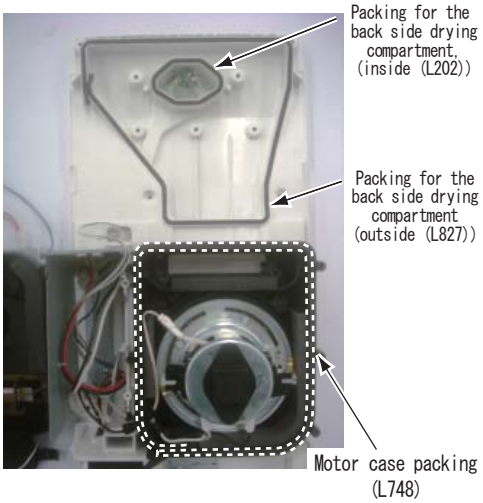
<Replacing the sub-assembled drying compartment A>

How to replace








Packing for the back side drying compartment, (inside (L202))
Packing for the back side drying compartment (outside (L827))
Motor case packing (L748)

6. Mat a curing sheet, then place the product with its rear side up on the sheet.
   ◆Point
   ・Be careful not to pinch harnesses.

7. Remove sub-assembled drying compartment screws (×11).

8. Put the product with its rear side down.

9. Remove the power terminal block temperature fuse harness and power line harness from the edge holder.

10. Remove the power line fast-on terminal and the grand wire fast-on terminal from the power terminal block.

11. Remove the motor cover screws (×8) and remove the motor cover.

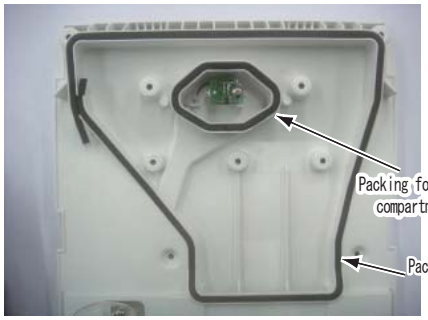
12. Remove the sub-assembled drying compartment.

13. Remove packing for back side drying compartment (inside (L202) and (outside (L827)), and the motor case packing (L748).

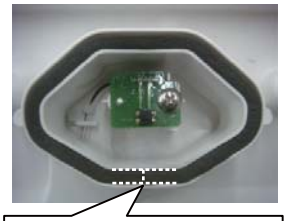
【Continue to the next page】

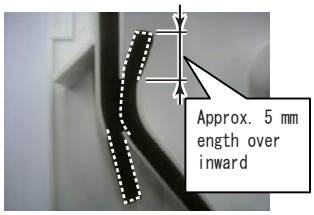
<Replacing the sub-assembled drying compartment A>

How to replace



[Rough indication of the extra length of packing]

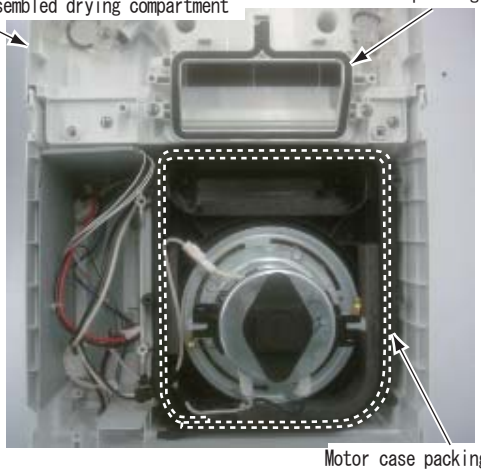




Face each edge of packing

Sub-assembled drying compartment

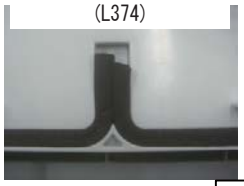
Chamber packing (L374)



Motor case packing (L748)

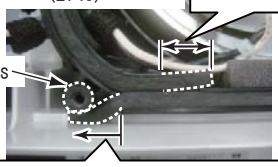
[Rough indication of the extra length of packing]

Chamber packing (L374)



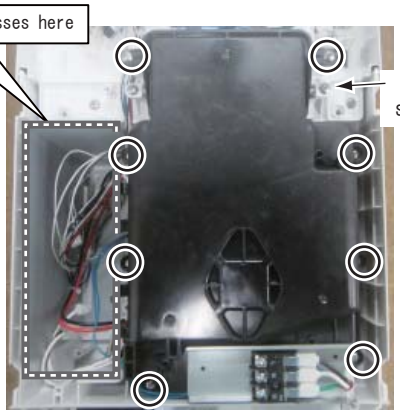
Motor case packing (L748)

Approx. 5 mm length over inward



Pull the extra part of line out from the boss

Fit harnesses here

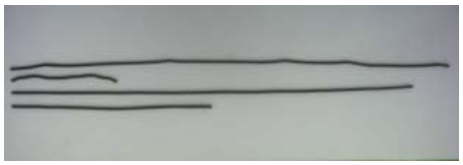


Motor cover screws (×8)

<Process to mount sub-assembled drying compartment A>

1. Mount packing for back side drying compartment (inside (L202) and outside (L827)).
   ◆Point
   · Fit the packing by squeezing, not pulling.
   · Confirm that no part of packing is standing out, distorted, or running off. Those parts will cause air to leak from the aperture and result in lower air speed.
   Abnormal noise might occur.

   Be careful not to mix up packing.
   · Packing for the back side drying compartment (outside (L827))
   · Packing for the back side drying compartment (inside (L202))
   · Motor case packing (L748)
   · Chamber packing (L374)



2. Mount the sub-assembled drying compartment onto the main unit case.

3. Mount motor case packing (L748) and chamber packing (L374).
   ◆Point
   · Fit the packing by squeezing, not pulling.
   · Confirm that no part of packing is standing out, distorted, or running off. Those parts will cause leaking the air from the aperture and result less air speed.

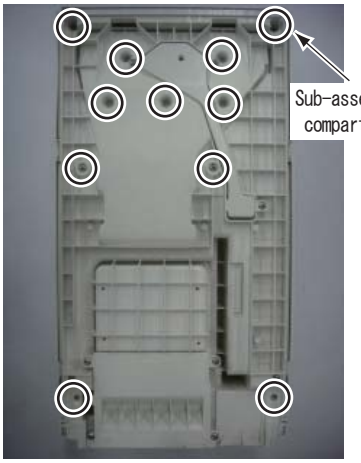
4. Put motor cover on, then fix the cover with fixation screws (×8).
   ◆Point
   · Confirm that no part of harness is pinched. Fixing screws with bad connection may cause air leaking during the unit operation, abnormal noise, or damage parts.

5. Fit harnesses into the sub-assembled controller insertion part.

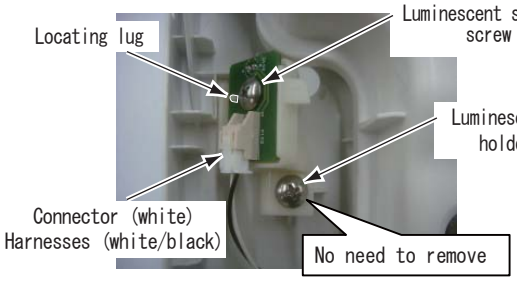
【Continue to the next page】

<Replacing the sub-assembled drying compartment A>

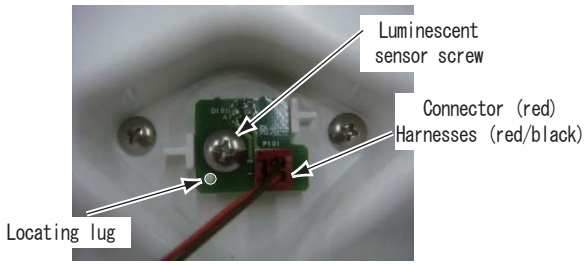
How to replace



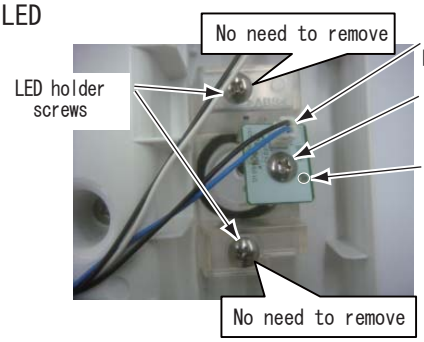
■Luminescent sensor (left and right parts)



■Luminescent sensor (center part)



■LED

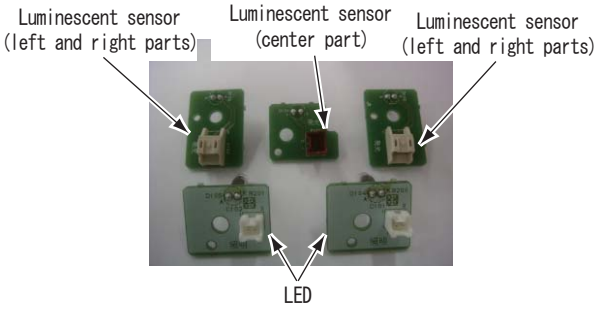


6. Mat a curing sheet, then place the product with its rear side up on the sheet.
   ◆Point
   ・Be careful not to pinch harnesses.

7. Fix the sub-assembled drying compartment with sub-assembled drying compartment screws (×11).

8. Put the product with its rear side down.

9. Mount the sensor LED lighting harness on the light receiving sensor and LED.



10. Mount luminescent sensor (left/right parts (×2) center part (×1)) with luminescent sensor screws (1 for each).
    ◆Point
    ・Align holes on the luminescent sensor at the locating lug to assemble.
    Mislocating the luminescent sensor may disable hand detection.

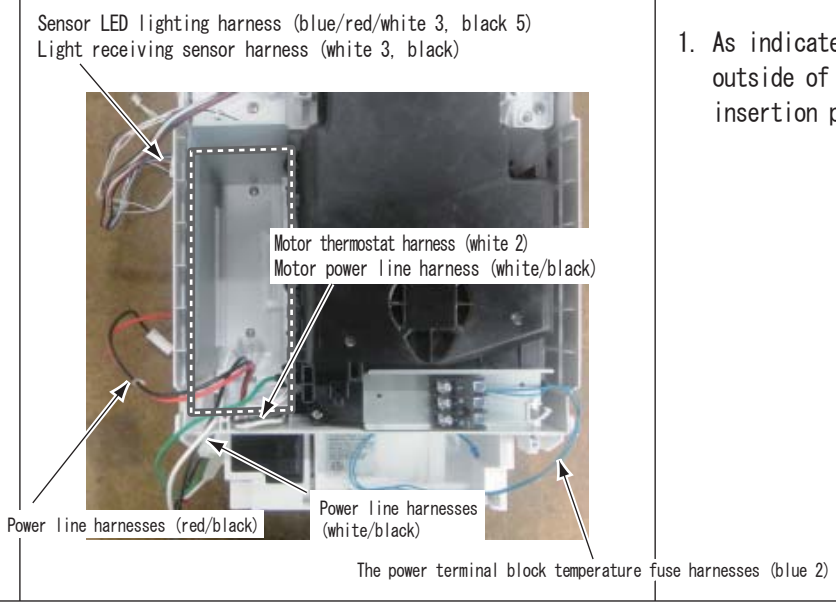
11. Mount LED (×2) with LED screws (1 for each).
    ◆Point
    ・Align holes on the LED at the locating lug to assemble.

12. After assembling, check the main unit operation referring to “How to organize cables” .(See pages 52 - 55)

How to organize cables

<Completion drawing after organizing cables>

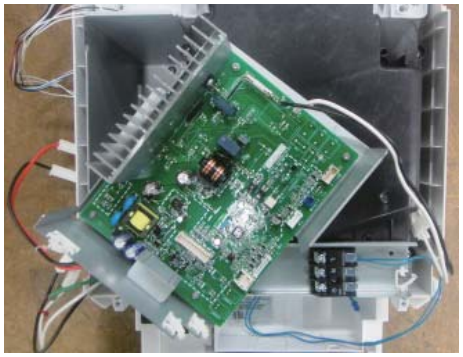
<Before organizing cables>

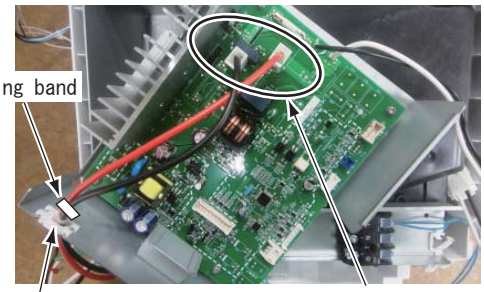

Sensor LED lighting harness (blue/red/white 3, black 5)
Light receiving sensor harness (white 3, black)
Motor thermostat harness (white 2)
Motor power line harness (white/black)
Power line harnesses (red/black)
Power line harnesses (white/black)
The power terminal block temperature fuse harnesses (blue 2)

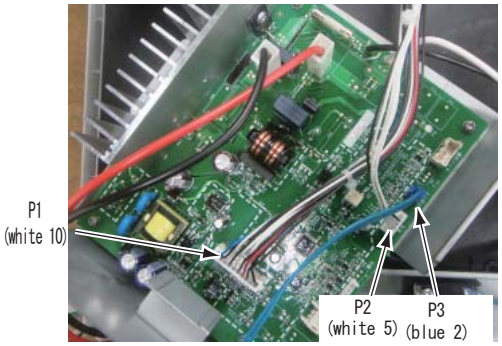
1. As indicated on the left, gather harnesses outside of the sub-assembled controller insertion part.

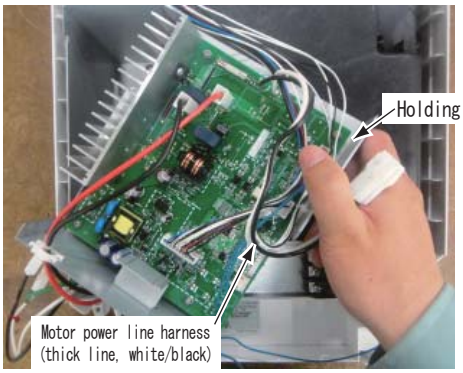
<Controller>

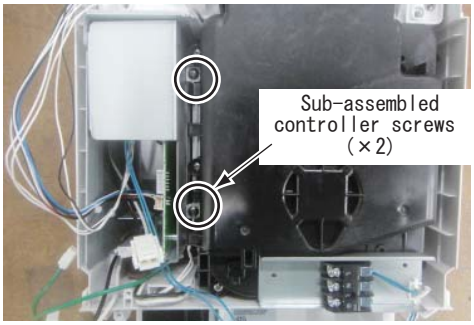
How to organize cables



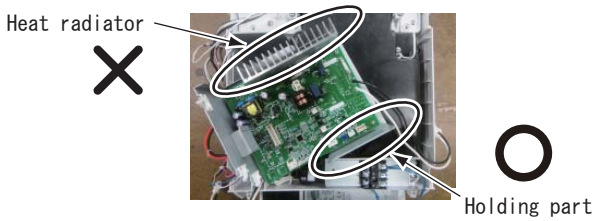








1. Put the sub-assembled controller as indicated on the left.
   ◆Point
   - Never hold the heat radiator.
   - When connecting fast-on terminal and connectors, operate with holding the holding parts.



2. Connect power line fast-on terminal.
   - TB1 (black), TB2 (red)

3. Fit power line harnesses (thick line, red/black) in the edge holder.
   ◆Point
   - When fitting those harnesses, place the banding band in the sub-assembling controller, inside of the edge holder.

4. Connect the signal line connector.
   - P1 (white, 10 pin)
   - P2 (white, 5 pin)
   - P3 (blue, 2 pin)

5. Hold the holding part and motor power line harnesses (thick line, white/black) with one hand, then insert the sub-assembled controller.

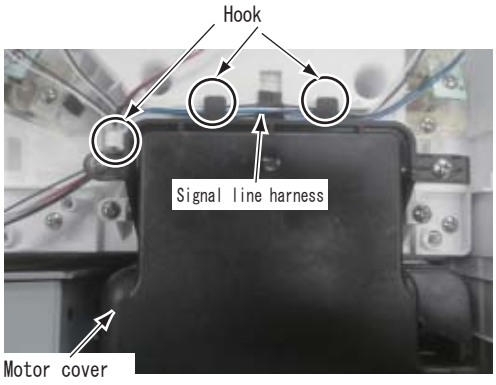
   ◆Point
   - Confirm that no part of harness is pinched.

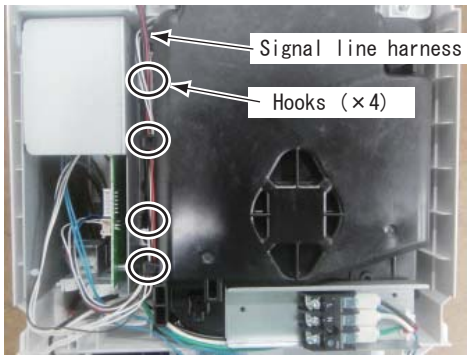
6. Fix the sub-assembled controller with sub-assembled controller screws (×2).

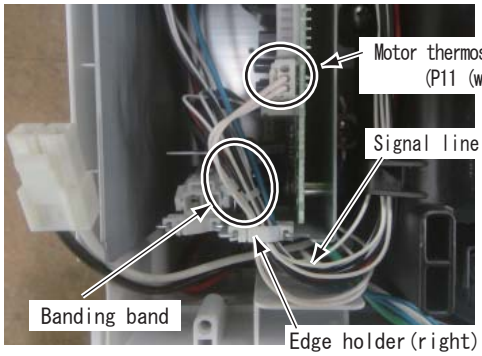
【Continue to the next page】

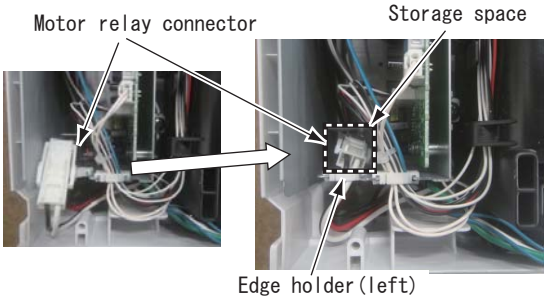
How to organize cables

<Around the motor cover>









1. Hook the signal line harness on hooks (×3) of the motor cover.
   ◆Point
   · Sensor LED lighting harness (only for luminescent sensor (right), LED (right))

2. Hook the signal line harness on hooks (×4) on the left side of the motor cover.
   ◆Point
   · Light receiving sensor harness
   · Sensor LED lighting harness

3. Connect the motor thermostat connector with the sub-assembled controller.
   · P11 (white, 3 pin)

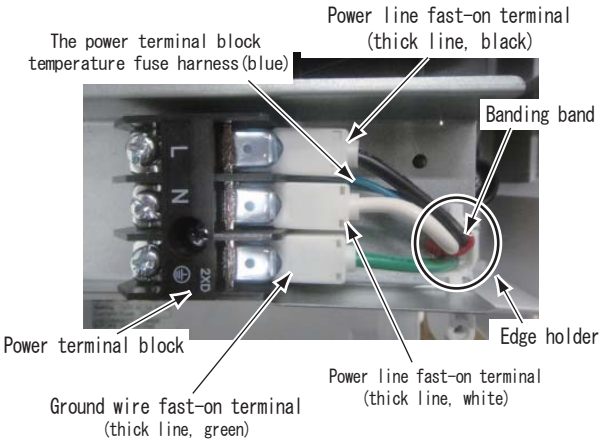
4. Fit the signal line harness in the edge holder (right).
   · Motor thermostat harness
   · Power terminal block temperature fuse harness
   · Harness of Step 2
   ◆Point
   · When fitting the banding bands attached to the harness, it should be nearer to the sub-assembled controller than the edge holder.
   · Fit the extra part of signal line harness in the sub-assembled controller.

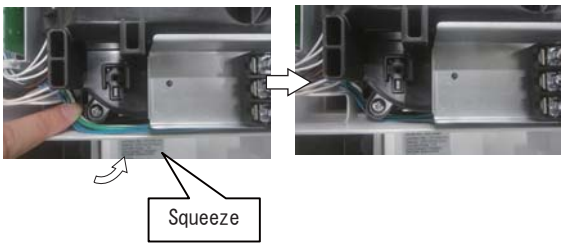
5. Connect the motor relay connector.

6. Fit the motor power line harness (thick line: black/white) in the storage space, then put it in the edge holder (left).
   ◆Point
   · As shown on the left, the motor relay connector should be nearer to the sub-assembled controller than the edge holder.

How to organize cables

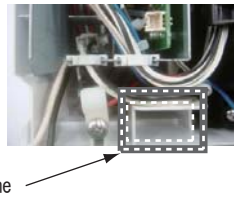
<Around the power terminal block>





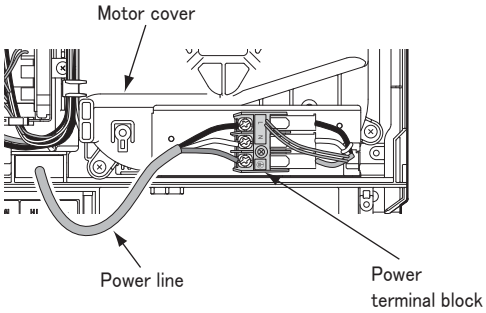
1. Connect the power line fast-on terminal (thick line, black/white) and the ground wire fast-on terminal (thick, green) to the power terminal block.
   ◆Point
   - Connect the power line fast-on terminal placing black above, and white below.

2. Fit the harnesses in the edge holder, as the terminal block temperature harness first, then the power line harness.
   ◆Point
   - Place the banding band of the power line harness above the edge holder.
   - Be careful not to cover the power line service entrance with the power line harness.



3. Squeeze the power terminal block temperature fuse harness and power line harness into the back side of the motor case.
   ◆Point
   - Be careful not to pinch the power terminal block temperature fuse harness and power line harness with the power terminal block and the front cover.

<After organizing all cables>



1. After organizing cables, visually check them against the "Completion drawing after organizing cables". (see page 52)

2. Withdraw the power line from the service entrance on the rear of the unit.

3. Install the product on the base plate, then fix it with the main unit screws (×2).

4. Insert the power line with the power source screws (×3) on the power terminal block.
   ◆Point
   - Let the power line out 15 mm straightly. Then make sure to insert the power line firmly seated in the power terminal block.

5. Confirm that the unit operates.

6. Mount the front cover, side covers, and water tray.

13 Q & A

(1) Conditions for installation

Q 1. Is the earth construction necessary? ・・・・・・・・・・・・・・・・・・・・・・・・57

Q 2. How high should the unit be located for use by children or users in wheel chairs? ・・・・57

Q 3. Can this unit be installed in the wall? ・・・・・・・・・・・・・・・・・・・・・・57

(2) Materials

Q 1. What are the parts of the product made from? ・・・・・・・・・・・・・・・・・・57

(3) Hygiene

Q 1. Won’t water be spattered from slits on the side covers? ・・・・・・・・・・・・・・・58

Q 2. Is alcohol or diluted sodium hypochlorite available to use for the unit? ・・・・・・・・58

(1) Conditions for installation

Q 1. Is the earth construction necessary ?

A No, this product doesn’ t need the earth construction. Because the outline of the product is fully covered with insulating material to ensure the insulation properties.

This is in line with legal requirements.

Q 2. How high should the unit be located for use by children or users in wheel chairs?

A Install the product at heights indicated below. (the top edge of the product/base plate location)
- For general use: 925 mm/890 mm
- For users in wheel chairs: 900mm/865mm
- For use by small children: 700mm/665mm

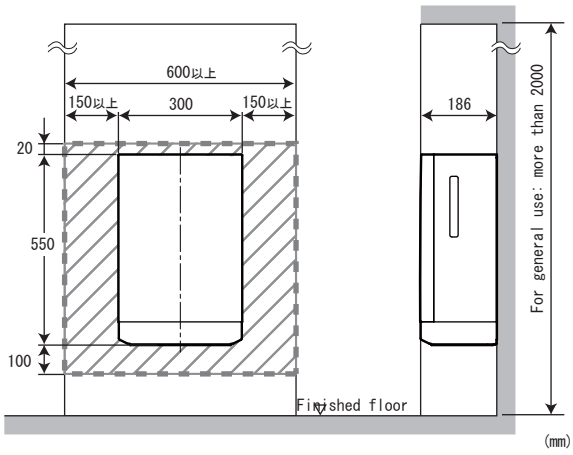
Keep some empty space from the bottom edge of the product. There should be no obstructions within 100 mm from the bottom edge of the product.
Otherwise, it might lead to a malfunction. As the obstruction prevents the product from taking enough air when in operating mode.

Refer to the installation guide , for the details about installation.

Q 3. Can this unit be installed in the wall?

A Yes it can be installed in a wall if there are spaces as indicated on the right.
This is a required space to prevent shoulders or heads hitting the wall.

For details, refer to “Installation in wall” in the product outline drawings.



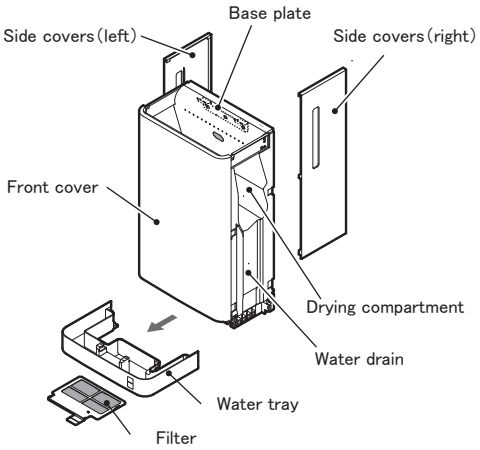
(2) Materials

Q 1. What are the parts of the product made from?

A Materials are listed below.

Names of parts	Material
Front cover	PP
Side covers	PP
Drying compartment	PP
Water drain	PP

Names of parts	Material
Filter	PP
Water tray	PP
Base plate	SPCC t=1.6



(3) Hygiene

Q 1. Won't water be spattered from slits on the side covers?

A Some ways of drying the hands may lead to spattering around the unit.
But it lowers the volume of spattering by innovation in the shape of the drying compartment and optimization of slit part design.

Q 2. Is alcohol or diluted sodium hypochlorite available to use for the unit?

A Only available for HDR120#WH.

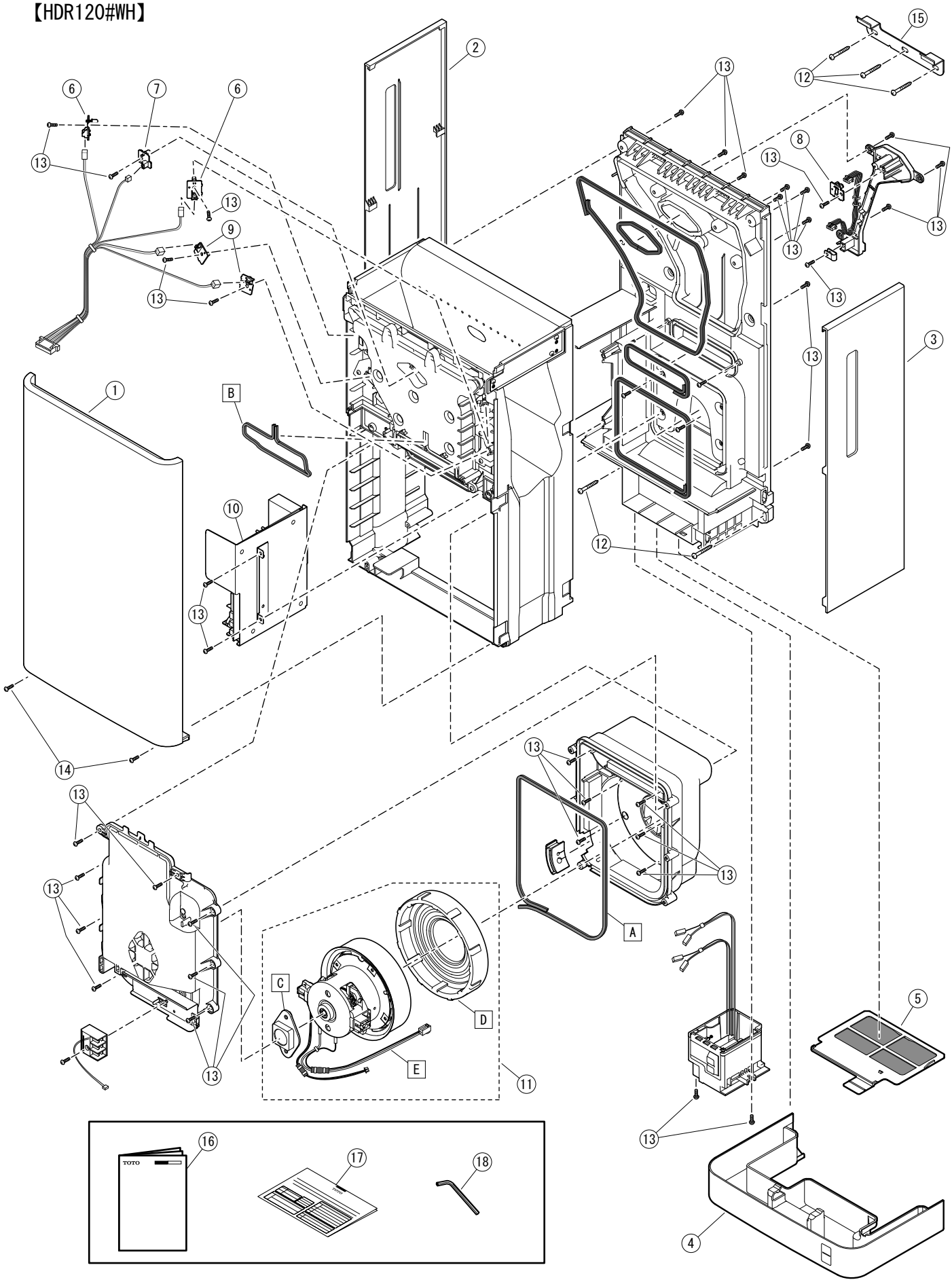
Adopting polypropylene resin for the outline plastic has enabled maintenance with alcohol or diluted sodium hypochlorite, which are used for hygiene management in food factories, etc..
However, using sodium hypochlorite is dangerous because of its character. When you use it, make sure to follow the "precautions for use" of sodium hypochlorite.

During cleaning, provide sufficient ventilation and prohibit to use CLEAN DRY, with consideration for users.

Also, note that improper maintenance will shorten the product's life dramatically. So please follow how to care and observe the precautions.

14 Parts list

【HDR120#WH】



*All parts for patching are provided in one-pack.
Confirm the quantity of use before the order.

Number in the drawing	Name of parts	Part number	Quantity of use (per unit)	Notes
1	Front cover	THP3023#WH (TYHC110)	1	
2	Side cover(left)	THP3024#WH (TYHC093)	1	
3	Side cover(right)	THP3025#WH (TYHC094)	1	
4	Water tray	THP3026 (TYHC095)	1	
5	Filter	THP3027 (TYHC096)	1	
6	Luminescent sensor (left and right)	THP3028 (TYHC101)	2	
7	Luminescent sensor (center)	THP3029 (TYHC102)	1	
8	Light receiving sensor	THP3030 (TYHC103)	1	
9	LED	THP3031 (TYHC104)	1	
10	Controller Assy.	THP3032 (TYHC100)	1	
11	Fan motor Assy.	THP3033 (TYHC106)	1	[Included parts] A: Extrusion packing (L748) B: Extrusion packing (L374) C: Rubber cushion(small) D: Rubber cushion(large) E: Sub-assembled power line F
12	Attaching screws	THP3034 (F30191)	5	
13	Truss head tapping screw (φ4×16)	THP3035 (F30331)	–	
14	Special tapping screw (φ4×16)	THP3036 (F30385)	2	
15	Base plate	THP3037 (TYHC111)	1	
16	Instruction manual	– (F06694)	1	
17	Instllation Manual	– (F06707)	1	
18	Vandal resist hex wrench	THP3052 (F29026)	1	